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UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

November 22, 1977

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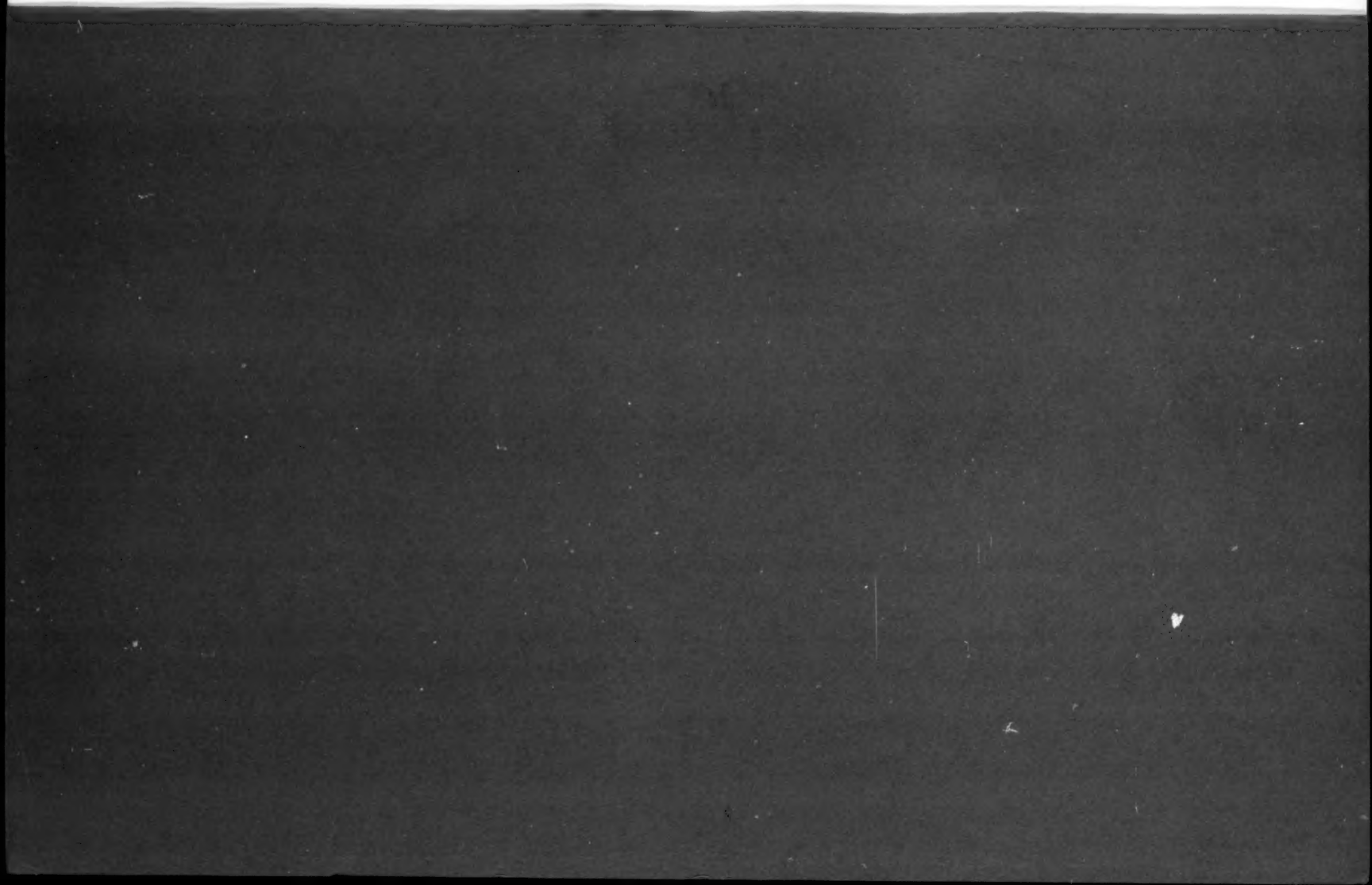

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PATENT AND TRADEMARK OFFICE NOTICES

Translations of Foreign Language References

Frequently, Office actions cite references that are in a foreign language. In the event a translation of the entire text or portion of the text of the reference is readily available in the examiners' search files, a copy of the translation will normally be included with the Office action. However, applicants are cautioned that the inclusion of a translation with a foreign language reference should not be construed to mean that the examiner used or relied on the translation, or that it is accurate or an official translation made by the Patent and Trademark Office.

While this service may be infrequent, it could be increased by the submission of translations by the applicant to the Office. Accordingly, it is requested that translations of foreign language references be transmitted to the Office, and in particular be transmitted with the response to the Office action or in a separate envelope addressed to: Commissioner of Patents and Trademarks, Washington, D.C. 20231. In addition, it would be of great assistance to the Office in filing the translation, if the translation carried the following: 1. an identification of the foreign language reference and, where possible, 2. its location in the examiners' search files (e.g. location should be known if reference was cited in Office action). If identifying information is not available, the incoming translation should carry the name "Scientific Library" thereon so that it can be processed by the Library.

WILLIAM FELDMAN,
Deputy Assistant Commissioner for Patents.

Date: Oct. 26, 1977.

Entry Into Force of the Patent Cooperation Treaty

The Patent and Trademark Office has received notification that the United Kingdom deposited its instrument of ratification for the Patent Cooperation Treaty (PCT) with the World Intellectual Property Organization (WIPO) in Geneva, Switzerland on October 24, 1977. This ratification fulfilled the requirements for entry into force of the PCT under Article 63 of the Treaty. Article 63 provides that the Treaty shall enter into force three months after eight States have deposited their instruments of ratification or accession, provided that at least four of the States have major patent activity as defined therein. The four countries with major patent activity which have ratified the Treaty are:

Federal Republic of Germany
Switzerland
United Kingdom
United States of America.

Ratifications or accessions to the PCT have also been deposited by:

Cameroon	Madagascar
Central African Empire	Malawi
Chad	Senegal
Congo	Togo.
Gabon	

Since the last required ratification was deposited on October 24, 1977, the Treaty will enter into force three months later, on January 24, 1978. It should be noted that the national PCT implementing legislation, Public Law 94–131 of November 14, 1975 (89 Stat. 685; 942 O.G. 177; and page 108 of the August 1976 issue of "Patent Laws") comes into force on the same day as the entry into force of the PCT. Therefore, Public Law 94–131 will also enter into force on January 24, 1978.

The date from which international applications under the PCT may be filed is currently expected to be in July of 1978; the exact date will be fixed by the Assembly of the PCT. The first meeting of the Assembly is currently expected to take place during April 1978. A copy of the PCT was published in the OFFICIAL GAZETTE on July 14, 1970 at 876 O.G. 341–388.

In view of the entry into force of the Patent Cooperation Treaty (PCT) on January 24, 1978 and the European Patent Convention (EPC) on October 7, 1977, applicants may now wish to prepare their national patent application papers for filing in the United States in the format required by the PCT and the EPC so that the application need not be later retyped and reformatted for PCT or EPC filing. The format requirements for applications under these two Treaties are identical. In the PCT most of these requirements appear in PCT Rule 11 while in the EPC the major requirements are found in EPC Rules 32 and 35.

Shortly after the PCT and Public Law 94–131 come into force, rule changes along the lines of those proposed in the OFFICIAL GAZETTE of February 8, 1977 (955 O.G. 350–363) will be promulgated which will make patent applications prepared in the PCT-EPC format completely acceptable as United States national patent applications.

Since applications may be filed and given a filing date under the EPC beginning June 1, 1978 and the PCT will be operational for the filing of international applications soon thereafter, applications which are currently being filed as U.S. national applications may serve as the basis for priority claims under these Treaties.

Preparation of United States national patent applications in PCT-EPC format is substantially possible today and may eliminate the need for reformatting and retyping the case if it is later filed as a PCT International application or an EPC European application.

There are only a few areas where present U.S. national format requirements conflict with PCT-EPC format requirements. The major differences are the sheet margins; page numbering, which, under PCT-EPC, is at the top; typing, which must be 1½ spaced under PCT-EPC; the location of the title and the abstract; and the drawing sheet size, which must be A4 (21 cm x 29.7 cm) under PCT-EPC. The Office will presently accept applications prepared on A4 size paper, with 1½ spacing between typed lines, page numbering at the top, and the title at the beginning of the abstract and description. In addition, if application papers are filed with the PCT-EPC margins, the margins requirements of 37 CFR 1.52(b) wil not be enforced.

The only remaining format problems are the location of the abstract and the drawing sheet size. Under the PCT-EPC, the abstract must be on a separate sheet which follows the claims. For current filing the title and abstract can be placed on a separate sheet without a number, with the first page of the description also containing the title and being numbered as page 1. For a later PCT-EPC application the abstract can be placed last and numbered in sequence. Drawings may be prepared to comply with the present U.S. national drawing size rcquirements (8½ x 14 inch sheets) but with a PCT-EPC sight size so that the sheets can later be cut down to A4 size.

Nov. 1, 1977. LUTRELLE F. PARKER,
Acting Commissioner of Patents and Trademarks.

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

2,515,754, Wolfe and Kessler, PANEL FOR USE AS A GATE, **filed** Aug. 4, 1976, D.C. Colo. (Denver), Doc. 76–W–770, *Moncrief-Lenoir Manufacturing Co.* v. *Life-Time, Inc., Life-Time Gate Co., R. B. Block and T. B. Shreve.* Motion and order of injunction and dismissal entered by court, June 20, 1977.

3,063,457, Bittner and Gnass, FOOT EXERCISER SANDALS, **filed** Mar. 21, 1977, D.C., E.D. Mo. (St. Louis), Doc. 77–301C(1), *Scholl, Inc.* v. *Modern Shoe Co., H. A. Waltuch, Robert J. Gamm and Michael Mathis.* Writ of injunction filed enjoining defendants from making, etc. articles of footwear referred to as "Olympus Exercise Sandals," May 12, 1977.

3,066,382, Zweigle and Humbert, STRANDED ALKENYL AROMATIC POLYMER FOAM FOR LOOSE-FILL PACKAGING, **filed** May 13, 1975, D.C.N.J. (Newark), Doc. 75–815, *The Dow Chemical Company* v. *Creative Displays Inc., Ampco Division.* Dismissed, June 27, 1977.

3,107,613, Armstrong, England, Parshall and Thatcher, BORON COMPOUND; **3,126,305,** R. K. Armstrong, IGNITION COMPOSITIONS COMPRISING BORON CONTAINING SALTS; **3,148,938,** W. H. Knoth, Jr., AMMONIA AND HYDRAZINE SALTS OF THE $B_{10}H_{10}^{-2}$ ANION; **3,149,163,** same, AMINE AND ORGANO-SUBSTITUTED HYDRAZINE SALTS OF THE $B_{10}H_{10}^{-2}$ ANION AND PROCESS FOR PREPARING SAME; **3,149,939,** B. W. Larsen, CENTRIFUGAL SEPARATOR; **3,184,286,** D. C. England, $C_{32}B_{12}H_{12}C_2NO_3$ PRODUCT AND PROCESS FOR MAKING SAME; **3,365,275,** E. L. Muetterties, POLYHYDROPOLYBORATES AND PROCESSES FOR PREPARING THEM; **3,431,089,** V. A. Engelhardt, REACTION PRODUCTS AND PROCESSES; **3,446,604,** E. L. Muetterties, ACID AND SALTS OF $B_{20}H_{18}^{-2}$ ION, **filed** Sept. 3, 1976, D.C., N.D. Calif. (San Francisco), Doc. C76–1892–CBR, *Teledyne McCormick Selph* v. *Robert C. Allen.* Action dismissed without prejudice, June 17, 1977.

3,126,305. (See 3,107,613.)

3,148,938. (See 3,107,613.)

3,149,163. (See 3,107,613.)

3,149,939. (See 3,107,613.)

3,173,583, E. A. Wahl, BIN ACTIVATOR, **filed** July 23, 1976, D.C.N.J. (Newark), Doc. 76–1412, *Eugene A. Wahl and Vibra Screw Incorporated* v. *Solids Flow Control Corporation.* Order granting defendant's motion for summary judgment, July 27, 1976.

3,184,286. (See 3,107,613.)

3,364,976, Reding and Bothwell, METHOD OF CASTING EMPLOYING SELF–GENERATED VACUUM, **filed** June 20, 1977, D.C., W.D. Okla. (Oklahoma City), Doc. 77–0584–D, *CMI Corporation* v. *Barco Manufacturing Company.*

3,365,275. (See 3,107,613.)

3,371,455, G. C. Fox, SWIMMING POOL STRUCTURE, **filed** Nov. 23, 1976, D.C., S.D.N.Y., Doc. 76–CV–494, *Fox Pool Corporation* v. *Imperial Pools, Inc.* Stipulated dismissal without prejudice pursuant to Rule 41(a)(1)(ii), F.R.C.P., filed June 21, 1977.

3,396,342, A. E. Feinberg, POWER SUPPLY CIRCUIT FOR CONTINUOUS WAVE MAGNETRON OPERATED BY PULSED DIRECT CURRENT, **filed** June 20, 1977, D.C.N.J. (Newark), Doc. C–77–1210, *Advance Transformer Company* v. *Mevlin L. Levinson.*

3,412,062, Johnson, Phillips and Watt, PRODUCTION OF CARBON FIBRES AND COMPOSITIONS CONTAINING SAID FIBERS, **filed** Mar. 15, 1972, D.C. Del. (Wilmington), Doc. 4347, *National Research Development Corporation* v. *Great Lakes Carbon Corporation and Great Lakes Research Corporation.* Stipulation of dismissal, pursuant to the provisions of Rule 41(a)(1) FRCP, it is hereby stipulated that the above action shall be dismissed with prejudice, June 3, 1977.

3,431,089. (See 3,107,613.)

3,446,604. (See 3,107,613.)

3,510,162, Smith and Binns, SELF-ADJUSTING LOCK; **3,642,314,** same, GRAVITY-ACTUATED LOCK, **filed** Aug. 8, 1974, D.C., E.D. Tex. (Texarkana), Doc. TX–74–96–CA, *Overhead Door Corporation* v. *Newcourt, Inc.* Judgment was entered showing that defendant has not infringed the above patents, nor induced infringement and judgment entered against plaintiff, June 9, 1977.

3,519,441, Ferrara and Snodgrass, PROCESS FOR TREATING FLOUR AND STARCH TO ELIMINATE FREE SH GROUPS, **filed** July 7, 1977, D.C., N.D. Tex. (Dallas), Doc. CA3–77–921–G, *Peter J. Ferrara* v. *Cargill Incorporated.*

3,642,314. (See 3,510,162.)

3,717,963, J. T. Sauriol, METER HOUSING; **Re. 28,640,** same, **filed** Sept. 29, 1975, D.C., N.D. Tex. (Dallas), Doc. CA–3–75–1195–D, *Roby Industries, Inc.* v. *Bass & Hayes Foundry, Inc. and Polyfoam Industries, Inc.* Pursuant to 35 U.S.C. 256, the Commissioner of Patents and Trademarks is directed to issue an appropriate certificate adding Walter H. Gross as joint inventor of said patents, June 11, 1977.

3,822,520, J. M. Crom, Jr., PRESTRESSED TANK AND METHOD OF PRODUCING SAME, **filed** June 9, 1977, D.C. Nev. (Reno), Doc. 77–0100, *The Crom Corp.* v. *John Crom, Jr.*

3,829,935, J. G. Critchfield, BUTTON COLLET, **filed** Oct. 22, 1976, D.C., W.D.N.C. (Statesville), Doc. ST–C–76–44, *Handy Button Machine Company* v. *Yarborough & Company.* Judgment and decree, effective Sept. 1, 1977, defendant is permanently enjoined from making, using or otherwise infringing said patent. The defenses and claims raised by the defendant are dismissed with prejudice, May 31, 1977. **Same, filed** Oct. 22, 1976, D.C., W.D.N.C. (Statesville), Doc. ST–C–76–45, *Handy Button Machine Company* v. *Graulin Enterprises Limited.* Judgment and decree, the defenses and the counterclaim of defendant are hereby dismissed with prejudice. Defendant is permanently enjoined from infringing said patent, June 20, 1977.

3,835,292, Walter, Kroheim and Levine, STEAM CURLING IRON, **filed** June 20, 1977, D.C. Del. (Wilmington), Doc. 77–230, *Clairol* v. *Conair.*

3,853,217, Scordato and Cohen, PIPETTE TIP PACKAGE, **filed** June 3, 1977, D.C., N.D. Ill. (Chicago), Doc. 77c1999, *Medical Laboratory Automation, Inc.* v. *Labcon, Inc.*

3,932,696, Fork, Lindner, Kelly and Albrecht, UNDERFLOOR ACCESS HOUSING UTILIZING A TROUGH SPACE OF A CELLULAR FLOORING UNIT, **filed** May 6, 1976, D.C.N.J. (Newark), Doc. 76–840, *Raceway Components, Inc. et al.* v. *H. H. Robertson Company.* Action dismissed, June 22, 1977.

3,935,322, Weiss, Campbell and Wilson, CHIP SEPARATING FROM A FRIED RIBBON; **3,937,848,** Campbell and Liedman, CHIP FRACTURING FROM A FRIED RIBBON, **filed** May 17, 1976, D.C., E.D. Tenn. (Chattanooga), Doc. 1–76–90, *General Mills, Inc.* v. *Standard Brands, Inc.* Patent 3,935,322 declared invalid, Apr. 26, 1977; stipulation and order of dismissal without prejudice as to the amended complaint and the counterclaim entered May 16, 1977.

3,937,848. (See 3,935,322.)

3,938,602, Sly and Salmans, SLICING SYSTEM WITH AUTOMATIC PORTION WEIGHT CONTROL, **filed** June 1, 1977, D.C., N.D. Ill. (Chicago), Doc. 77c1949, *Eugene L. Sly* v. *Portion Systems Inc.*

3,954,124, R. E. Self, HIGH ENERGY LOSS NESTED SLEEVE FLUID CONTROL DEVICE, **filed** June 9, 1977, D.C., C.D. Calif. (Los Angeles), Doc. CV77–2102–F, *Control Components, Inc.* v. *Atlantic Richfield Co. et al.*

4,026,037, A. Buchholz, APPARATUS FOR STEAM DRYING, **filed** June 13, 1977, D.C. Oreg. (Portland), Doc. 77–448, *Champion International Corporation, Inc.* v. *Adolf Buchholz, also known as Al Buchholz and Buchholz Industries, Inc.*

Re. 25,570, J. H. Lemelson, EXTRUSION APPARATUS, **filed** Aug. 12, 1976, D.C.N.J. (Newark), Doc. 76–1583, *Jerome H. Lemelson* v. *Kautex-Werke, Reinold Hagen GmbH and Kautex Machines Inc.* Action dismissed, June 21, 1977.

Re. 28,640. (See 3,717,963.)

D. 227,722, M. A. Mendlin, COMBINED BED AND STORAGE UNIT; **D. 227,723,** same, COMBINED BUNK BED AND STORAGE UNIT; **D. 227,725,** same, **filed** June 7, 1977, D.C.N.J. (Newark), Doc. C–77–1106, *Bunk Trunk Distributors* v. *Unique Headboard Company, Inc.*

D. 227,723. (See D. 227,722.)

D. 227,725. (See D. 227,722.)

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

3,913,512, Re. S.N. 837,167, Filed Sept. 27, 1977, Cl. 114/260, VESSEL FOR FLOTATION LOADING AND UNLOADING AND PARTIAL BUOYANCY SUPPORT OF BARGES AND OTHER FLOATING CARGOES, William Everett Kirby, et al., Owner of Record: *Wharton Shipping Corporation, Edificio Vallarino, Panama,* Attorney or Agent: Robert E. Wickersham, et al., Ex. Gp.: 315

3,940,125, Re. S.N. 831,771, Filed Sept. 9, 1977, Cl. 271/10, PICKING AND TRANSPORTING MEANS FOR FABRIC SECTIONS AND THE LIKE, Kenneth O. Morton, Owner of Record: *Cluett, Peabody & Company, Inc., New York, N.Y.,* Attorney or Agent: Hubert T. Mandeville, et al., Ex. Gp.: 313

3,943,930, Re. S.N. 836,405, Filed Sept. 26, 1977, Cl. 128/287, DISPOSABLE DIAPER, Charles H. Schaar, Owner of Record: *Colgate-Palmolive Company, New York, N.Y.,* Attorney or Agent: Martin Kirkpatrick, Ex. Gp.: 335

3,969,148, Re. S.N. 833,831, Filed Sept. 16, 1977, Cl. 136/173, ADAPTER FOR DRY CELL BATTERIES, Burton C. Trattner, Owner of Record: *Inventor,* Attorney or Agent: Albert C. Nolte, Jr., et al., Ex. Gp.: 114

3,976,247, Re. S.N. 829,112, Filed Aug. 30, 1977, Cl. 239/135, LOW-TEMPERATURE MELTING METALS SPRAY-GUN, Carmelo Maniglia, Owner of Record: *Tinning Sprayer S.r.l., Genoa, Italy,* Attorney or Agent: None, Ex. Gp.: 313

3,977,058, Re. S.N. 837,233, Filed Sept. 27, 1977, Cl. 28/1.7, METHOD AND APPARATUS FOR CONTROLLING YARN PLUG LENGTH, David E. Borenstein, et al., Owner of Record: *Phillips Petroleum Company, Bartlesville, Okla.,* Attorney or Agent: Donald J. Quigg, et al., Ex. Gp.: 352

3,978,806, Re. S.N. 837,145, Filed Sept. 27, 1977, Cl. 114/260, VESSEL WITH FLOODED HOLD FOR TRANSPORT OF BARGES, William Everett Kirby, et al., Owner of Record: *Wharton Shipping Corporation, Edificio Vallarino, Panama,* Attorney or Agent: Robert E. Wickersham, et al., Ex. Gp.: 315

3,998,374, Re. S.N. 838,442, Filed Sept. 30, 1977, Cl. 228/107, METHOD OF FORMING A LAMINATE, Benjamin Howell Cranston, et al., Owner of Record: *Western Electric Company, Incorporated, New York, N.Y.,* Attorney or Agent: S. I. Rosen, et al., Ex. Gp.: 323

4,016,971, Re. S.N. 836,384, Filed Sept. 26, 1977, Cl. 198/850, CONVEYOR FOR USE IN TOBACCO SHREDDING APPARATUS, Werner Komossa, et al., Owner of Record: *Hauni-Werke Korber & Co. KG, Hamburg, Germany,* Attorney or Agent: David S. Kane, et al., Ex. Gp.: 313

4,022,352, Re. S.N. 837,916, Filed Sept. 29, 1977, Cl. 222/153, CONTAINER COVER AND SAFETY CLOSURE, Harold T. Pehr, Owner of Record: *Inventor,* Attorney or Agent: Claude A. Fishburn, et al., Ex. Gp.: 311

4,039,478, Re. S.N. 834,528, Filed Sept. 19, 1977, Cl. 252/455, FLUE GAS DESULFURIZATION SORBENT, Neville L. Cull, et al., Owner of Record: *Exxon Research and Engineering Company, Linden, N.J.,* Attorney or Agent: Jerome E. Luecke, Ex. Gp.: 115

4,039,954, Re. S.N. 838,990, Filed Oct. 3, 1977, Cl. 325/308, SIGNAL DISTRIBUTION DEVICE FOR A CABLE TELEVISION, Pieter Den Toonder, Owner of Record: *Oak Holland B.V., Emmen, The Netherlands,* Attorney or Agent: James B. Kinzer, et al., Ex. Gp.: 233

XEROX LICENSE OFFER

This notice is published pursuant to a CONSENT ORDER TO CEASE AND DESIST dated July 29, 1975 between Xerox Corporation and the Federal Trade Commission.

TERMS *contained in this notice are defined in the Consent Order. All interested parties should refer to that document for the definitions and additional details of Xerox' patent and know-how licensing obligations thereunder.* A copy of the Consent Order and a list of PATENTS licensed to Xerox which are subject to the provisions of paragraphs II and IV (C) (9) of the Order, if any, are available from Xerox upon written request. All such requests and any request relating to the licensing of PATENTS and the licensing and disclosure of KNOW-HOW pursuant to the Consent Order should be made in writing and addressed to:

The Manager of Patent Licensing
Xerox Corporation
Stamford, Connecticut 06904

Xerox shall in accordance with the terms of the Consent Order:

(1) Grant licenses under
  (a) its ORDER PATENTS to make, have made, use and vend OFFICE COPIER PRODUCTS under the terms of the Consent Order, and
  (b) patents which are required to be licensed pursuant to the terms of paragraph X of the Consent Order, if any, and

(2) Disclose certain written materials as provided in the Consent Order [KNOW-HOW] to any LICENSEE of its United States ORDER PATENTS for use in connection with the manufacture of OFFICE COPIER PRODUCTS in the United States upon payment of the cost of collection and duplication of the requested materials.

The following is a list of patents which is believed to include all of the PATENTS available for licensing in accordance with the terms of the Consent Order. Fuji Xerox, Ltd. patents which also make up part of the list are grouped separately. There also follows a classification index for use in conjunction with the classification data appearing in the patent list to identify the category of the patent and a schedule of foreign countries and their corresponding key letters which are used in identifying corresponding foreign patents in the list. Since the classification system is not restricted solely to OFFICE COPIER PRODUCTS there are several patents included in the list to which the Consent Order is not applicable.

LIST CLASSIFICATION

The Patents are listed in numerical order according to their class assignment. For example, all U.S. patents classified as 1(A) appear at the beginning followed by those classified as 1A1, 1A1A, 1A1B, etc. The left-hand column shows the U.S. patent number. To the right of the U.S. patent number is its title followed by its issue date. Following the U.S. patent issue date is a list of the foreign patents based on the U.S. patents. An example of how the list should be used is as follows:

Under Class 1A which is entitled "Electrostatographic Systems, Imaging Systems—Distinctive Photosensitive Members Imaged", two U.S. patents are listed—2,573,881 which issued November 6, 1951 with corresponding patents in Australia, Canada, Germany, Great Britain, Switzerland and Sweden, and 3,877,936 which issued April 15, 1975 with a corresponding patent in Belgium.

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2. DISTINCTIVE PHOTOSENSITIVE MEMBERS
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     1. Inorganic
        - a. Selenium
        - b. Alloys of Selenium with Arsenic and/or Antimony
        - c. ArS and Combinations Thereof with Selenium
        - d. Group III A Phosphides (Ga, Al or B)
        - e. Chalcogenides (Compounds Containing O, S, Se, or Te)
          - (1) ZnO
          - (2) PbO
        - f. Dye Sensitized Inorganic Photoconductors
        - g. Inorganic Photoconductors in Glass Binders
     2. Organic
        - a. Photosensitive Organic Compounds in a Binder
        - b. Lewis Acid Charge Transfer Complexes
   - B. Multi-Layered Photosensitive Members
     1. Members Having Subadjacent Barrier Layers
     2. Members Having Protective Overlayer
     3. Members Having Electroluminescent Layer
     4. Members Having Releasable or Soluble Layer
   - C. Deformation Imaging Members
   - D. Fibrous Photosensitive Member
   - E. Photosensitive Members—Novem Fabrication Techniques and Configurations
   - F. Apparatus for Alignment of Photosensitive members

3. CHARGING SYSTEMS
   - A. Induction Charging Systems
   - B. Non-Uniform Charging Systems
   - C. Corotron Charging Systems
     1. A.C. Charging
     2. Negative Charging
     3. With Fringe or Needle-like Electrodes
     4. Scorotron Charging
     5. Bipolar Charging
     6. Charge Level Smoothing
     7. Toner Dust Control
     8. Charge Sensing to Terminate Charging

9. Transfer From Intermediate Insulating Member
D. Charging Across a Liquid Layer
E. Charging a Semiconductive Photoconductor
F. Charging Including Illumination of Photoconductor

4. OPTICAL IMAGE FORMATION AND PROJECTION
A. Illumination of Original
1. Light Sources and Method of Illumination
2. Document Holders
a. Platen Covers
3. Illumination Control Systems
B. Projection of Optical Image onto Photoresponsive Member
1. Scanning Systems—In General
a. Distinctive Optical Scanning Systems
(1) Lens Strip
(2) Fiber Optics
(3) Half Tone Projection Systems
(4) Fresnel Lens
2. Simultaneous Charging and Projection of Optical Image
3. Distortion of Optical Image (e.g., for Coding Purposes)
4. Full Frame Exposure
5. Reflex Exposure
6. Projection with Variable Magnification
a. Magnification with Fixed Optical Path Length
7. Projection of Composite Image
C. Control of Image Contrast

5. LATENT IMAGE DEVELOPMENT SYSTEMS AND COMPOSITIONS
A. Powder Cloud Development
1. Aerosol Development Methods and Apparatus in General
a. Plate Development Apparatus
2. Cloud Charging Methods and Devices
3. Specific Toner and/or Gas Supply Devices and Methods
a. Belt and Porous Material Toner Supply Device
b. Cloud Directing Devices and Methods
4. Induction Development
5. Cleaning Devices
6. Charcoal Development Method
B. Fibrous Brush Development Devices and Methods
C. Magnetic Brush Development (Dry)
1. Magnetic Brush Development Methods and Devices
a. Magnetic Belt Devices
b. Loading Devices
2. Color Producing Development
3. Single Component Magnetic Developer
D. Cascade Development
1. Gravitational Developer Handling Methods and Devices
a. Incremental (e.g., Bucket Devices)
b. Continuous (e.g., Wheel)
c. Magnetic
d. Non-Linear Developer Flow
2. Impact Developing Methods and Devices
3. Developer Contact and Concentration Control Apparatus
4. Background Suppression Apparatus
5. Flat Plate Development
E. Liquid Development
1. Liquid Aerosol Development
2. Emulsion Development
3. Encapsulated Liquid Development
4. Electrophoretic Development
5. Polar Ink Development
F. Donor Development Methods and Apparatus
G. Dense Bed Development Methods and Apparatus
H. Fluidized Bed Development Methods and Apparatus
I. Toner and Developer Dispensing Methods and Apparatus
1. Developer Dispensing
2. Toner Dispensing
a. Powdered Toner Containers
b. Solid Toner Containers
c. Dispensing Apparatus
(1) Without Concentration Control
(2) With Concentration Control
J. Development Electrodes
1. Electrode Types in General
2. Segmented Electrodes
3. Flexible Electrodes
4. Self-Cleaning Electrodes
5. With Variation of Potential
K. Contrast and Large Area Development Enhancement
L. Simultaneous Positive-Negative Formation
M. Reversal Development
N. Developer, Toner and Carrier Compositions
1. Three Component Developer-Carrier, Toner and Additive
a. Inorganic Additive
b. Organic Additive
2. Two Component Developer
a. Distinctive Toner
(1) Polystyrene-Containing
(2) Phenol-Formaldehyde Containing
b. Distinctive Carrier
3. One Component
4. New Carriers
5. New Toners
a. Distinctive Pigment
b. Encapsulated Liquids
6. Developer Manufacture
a. Carrier Preparation
b. Toner Preparation
O. Miscellaneous
P. Simultaneous Development and Cleaning

6. COPY SUBSTRATE HANDLING SYSTEMS
A. Paper Holding Trays
1. With Stack Height Control
B. Seriatim Stack Feeding Devices
1. Mechanical
2. Aeriform
C. Non-Seriatim Stack Feeding Devices
D. Sheet Tracking, Registration, Aligning, Conveying Devices
1. Belt Conveyors
2. Clutch Mechanisms
E. Sheet Holding Devices (During Image Transfer)
F. Mispuff and Multiple Sheet Detecting Devices

- G. Counter Devices
- H. Sheet Stripping Devices
- I. Sheet Cutting Devices
- J. Sheet Inverting Devices
- K. Copy Distribution, Collection and Sorting Devices

7. DEVELOPED IMAGE TRANSFER AND DISPLAY
   - A. Image Display Systems
     1. Reflective Projection
     2. Transmittive Projection
   - B. Chemical Treatment to Enhance Transfer
   - C. Electrostatic Transfer of Toner
     1. Corona Charging Systems
        a. With Conductive Transfer Web
     2. A.C. Field Transfer
     3. Multiple Transfer
     4. Selective Transfer
   - D. Magnetic Transfer of Toner
   - E. Pressure Transfer of Toner
     1. With Heat
     2. With Solvent
     3. With Tackified Copy Substrate
        a. Gelatin Coated Substrate

8. IMAGE FIXING SYSTEMS
   - A. Heat Fixation
     1. Radiation
        a. Flash Heating
        b. Control Systems
        c. Glass Panel Heating
     2. Conduction
        a. With Pressure Means
     3. Convection
     4. Induction
   - B. Fixation with Vapor Fixative
     1. Fixative Removal
   - C. Fixation with Liquid Fixative
   - D. Fixation with Solid Fixative
   - E. Fixation with Pressure
     1. Gelatin Coated Copy Substrate

9. CLEANING OF IMAGING SURFACE
   - A. Frictional
     1. Web
     2. Brush
        a. With Brush Scraper
        b. With Electrostatic Assist
           (1) Within a Liquid
        c. Filter Bag For Use with
   - B. Non-Frictional
     1. Magnetic Brush
     2. Cleaning Beads
     3. Liquid

10. DOCUMENT HANDLING
    - A. Document Feed Apparatus
    - B. Microfiche Handling Systems
    - C. Stack Feeding Apparatus
    - D. Facsimile Feeding Apparatus
    - E. Document Registration Systems
    - F. Document Inverting Apparatus
    - G. Stacking and/or Imbricating Apparatus
    - H. Collating Apparatus
    - I. Document Jamming Detection Devices

12. PHOTOELECTROPHORESIS
    - A. Basic Process and Materials
    - B. Basic Apparatus
    - C. Machines
    - D. Air Breakdown
    - E. Blocking Electrode
    - F. Camera Apparatus
    - G. Cleaning
    - H. Apparatus Components
    - I. Composite Particle
    - J. Fixing
    - K. Inking
    - L. Masking
    - M. Pigments (Including PEP Use of Particular Pigment)
    - N. Process Variation
    - O. Sensitizors
    - P. Shear
    - Q. Transfer
    - R. Use of Image

15. IMAGING SYSTEMS OTHER THAN ELECTROSTATOGRAPHIC
    - A. Deformation Imaging
    - B. Polymerization Imaging
      1. Photopolymerization Imaging
      2. Charge Injection Polymerization Imaging
    - C. Ferromagnetic Imaging
    - D. Photochromic Imaging
    - E. Vesicular Imaging
    - F. Exposure Only Imaging

17. OPTICAL SYSTEMS
    - A. Radiation Sensing
      1. X-ray, Ultraviolet
      2. Solar Cell
      3. Spectral Response Junctions
      4. Photocell Circuits
    - B. Optical Projection and Modulation
      1. Image Projection
      2. Lenses, Transparencies
      3. Kerr Cell
      4. Modulators
    - C. Image Conversion and Intensification
      1. Emission
      2. Infrared
      3. Passive
      4. Active (Semiconductor)
    - D. Character Generation and Display Devices
      1. Deflection Generated Display
      2. Character Mask
      3. Translation and Function Generation
      4. Justifier
      5. Optical Lens Arrangements
    - E. Optical Imaging and Scanning
      1. Photosensitive Scanners and Spot Scanning Systems
      2. Field Effect Scanners
      3. Lenticular
      4. Scanning Lens Strip and Rotating Mirror Mechanisms
      5. Thermotropic, Thermal, Deformation
      6. Optical Stabilizing Devices
    - F. Electron Beam Devices

1. Tubes
2. Circuits

G. Electroluminescent Devices
1. Storage with Field Effect Device
2. Storage Panels—Construction
3. Display, Actuation
4. Enhancement, Amplifications, Conversion

H. Stimulated Emission Devices
1. Laser Structure and Materials
2. Laser Structures
3. Laser Optical Systems and Applications

I. Optical Devices
1. Pressure Gauge
2. Density Measuring
3. Fiber Optics

J. Miscellaneous

18. CHEMICAL COMPOSITIONS AND PREPARATION THEREOF

A. Photosensitive
1. With a Liquid Vehicle
2. Phthalocyanine
a. X-Form
3. Carboxamides
4. Naphthols

B. Polymers

C. Developer, Toner and Carrier Compositions
1. Three Component Developer-Carrier, Toner and Additive
a. Inorganic Additive
b. Organic Additive
2. Two Component Developer
a. Distinctive Toner
(1) Polystyrene-Containing
(2) Phenol-Formaldehyde Containing
b. Distinctive Carrier
3. One Component Developer
4. New Carriers
5. New Toners
a. Distinctive Pigment
b. Encapsulated Liquids
6. Developer Manufacture
a. Carrier Manufacture
b. Toner Preparation

D. Brazing Compositions

20. MECHANICAL COMPONENTS

A. Mechanical Reaction Devices
1. Belts
2. Drives
3. Pulleys and Rollers
4. Load Movers
5. Clutch
6. Transport Motor and Speed Controls

B. Dispensing and Filtering Devices
1. Powder Cloud
2. Particulate Material Dispensing, Distribution
3. Filtering

C. Sensing Devices
1. Powder Level
2. Temperature
3. Quality (Web)
4. Pressure Gauge
5. Wind
6. Weight
7. Thickness

D. Work Devices (Mechanical)
1. Holding, Forming, Feeding
2. Bonding and Fastening
3. Coupling (Pipe)
4. Testing
5. Molding
6. Valves
7. Sizing

E. Antenna Structure

F. Fluid Amplifiers and Magnetically Controllable Switching Devices

G. Miscellaneous

21. METAL WORKING, FORMING AND TREATING

A. Electroforming and Plating
1. Methods
2. Structure
3. Apparatus

B. Metal Treating

24. GRAPHIC ARTS

A. Liquid Ink Recording
1. Electrically Responsive System
2. Electromechanically Responsive System
3. Magnetically Responsive System
4. Photoresponsive System

B. Photographic Copying
1. Transparency Formation
a. Document Support
b. Projection and Exposure
(1) Simultaneous Exposure and Development of Different Frames
(2) Image Reversal Optics
(3) Automatic Masking
c. Transparency Identification
d. Frame Counting and Locating
e. Miscellaneous
2. Contact Printing From a Transparency
a. Transparency Feed
b. Establishing and Maintaining Contact Between Transparency and Copy Material
c. Exposure Control
d. Transfer Imaging
(1) Image Layer Support Strip
3. Processing
a. Material Purification
b. Transparency Transport
4. Viewing

C. Duplicating
1. Method and Apparatus
a. Thermographic
b. Pressure Applied to Sandwich of Original, Transfer and Receiving Sheet
c. Transfer of Electrostatic Charge Through Stencil
d. Condensation Imaging
e. Spirit and Dry Duplicating Systems (Including ELCAR)
(1) Means for Rotably Mounting a Transfer Sheet
(2) Means for Establishing Pressure Between Transfer Sheet and Copy Substrate
(3) Copy Substrate Handling
(4) Program Control
(5) Formation of a Spirit Duplicating Transfer Sheet
(6) Formation of a Stencil Transfer Sheet

(7) Composition of a Transfer Sheet, Receiving Sheets and Printing Inks
D. Planographic Imaging (Including Lithography)
E. Relief Imaging
F. Gravure Printing
G. Miscellaneous

25. ELECTRONIC COMPONENTS
A. Passive Components
1. Printed Circuit Boards
2. Semiconductor Devices
3. Thin Film Components
4. Connectors
B. Active Components
1. Space Charge Devices
2. Junction Devices
3. Thermionic Conversion Devices
4. Thyratrons
C. Circuits
1. Amplifiers
2. Switching
3. Oscillators and Generators
4. Pulse Circuitry, Including Signal Storage and Delay
5. Power Supply
6. Miscellaneous

26. DESIGN PATENTS
A. Reproduction Apparatus
1. In General
2. Document Feeding Apparatus
3. Transfer and Fusing Apparatus
4. Printer
5. Camera
B. Sorting and/or Storing Apparatus
C. Containers for Xerographic Powder
D. Labeling Apparatus
E. Facsimile Transmission Apparatus
1. In General
2. Transceiver Paper Feed Apparatus
3. Adapter for Facsimile Computer System
F. Microform Apparatus
1. Viewer and/or Copier
G. Educational Devices
1. Scales
H. Miscellaneous
1. Housing For Electronic Apparatus
2. Computer Keyboard
3. Send/Receive Data Printer Terminal
4. Telephone Acoustic Coupler
5. Prism
6. Paper Shredder
7. Other

27. PHOTOGRAPHY
A. Direct Printout Members
B. Direct Printout Processes
C. Imaging Member Fabrication
D. Photographic Processes Generally

30. MANIFOLD
A. Basic Process
B. Apparatus
C. Process Variations
D. Activation
E. Image Transfer and Fixing
F. Duplication Masters
G. Image Reversal
H. Reflex Imaging
I. Color Processes

31. MIGRATION IMAGING (XDM)
A. Basic Process
B. Apparatus
C. Process Variation
D. Imaging Members
E. Imaging Member Fabrication
F. Imaged Members
G. Stripping and Splitting
H. Reversal
I. Fixing
J. Duplicating Masters
K. Color
L. Use of Image

32. MISCELLANEOUS
A. Energy Cells
B. Miscellaneous

FOREIGN COUNTRY KEY LETTER CODE

COUNTRY KEY	COUNTRY NAME
AAA	NO FOREIGN FILING
ALB	ALBANIA
ALG	ALGERIA
ARG	ARGENTINA
ATR	AUSTRIA
AUS	AUSTRALIA
BAH	BAHAMAS
BAR	BAHRAIN
BEL	BELGIUM
BOL	BOLIVIA
BRA	BRAZIL
BRS	BR. SOLOMON ISL.
BRU	BRUNEI
BUL	BULGARIA
BUR	BURUNDI
CAM	CAMBODIA
CAN	CANADA
CEY	CEYLON
CHL	CHILE
CHN	CHINA
CLB	COLOMBIA
COR	CONGO REP. (ZAIRE)
COS	COSTA RICA
CUB	CUBA
CZC	CZECHOSLOVAKIA
DNK	DENMARK
DOR	DOMINICAN REP.
ECD	ECUADOR
EGP	EGYPT
EGR	E. GERMANY
EIR	EIRE
ELS	EL SALVADOR
FIJ	FIJI
FIN	FINLAND
FOM	FORMOSA
FRA	FRANCE
GER	GERMANY
GHA	GHANA
GIB	GIBRALTAR
GIE	GIBERT & ELLICE
GNR	GUINEA REP.
GRB	GR. BRITAIN
GRK	GREECE
GUA	GUATEMELA
GUR	GUERNSEY
HGK	HONG KONG
HOL	HOLLAND
HON	HONDURAS
HUN	HUNGARY
ICE	ICELAND
IDS	INDONESIA
IND	INDIA
IRL	IRELAND
IRN	IRAN
ISR	ISRAEL
ITL	ITALY
JAM	JAMAICA
JAP	JAPAN
JER	JERSEY
KEN	KENYA
KOR	KOREA
KUW	KUWAIT
LAS	LAOS
LEB	LEBANON
LIB	LIBERIA
LXB	LUXEMBOURG
MAU	MAURITIUS
MEX	MEXICO
MLI	MALI
MLS	MALASIA
MLT	MALTA
MLW	MALAWI
MNC	MONACO
MRC	MOROCCO
NIG	NIGERIA
NOR	NORWAY
NZL	NEW ZEALAND
PAK	PAKISTAN
PLD	POLAND
PLP	PHILIPPINES
PNM	PANAMA
PRU	PERU
PTG	PORTUGAL
RHD	RHODESIA
RMN	RUMANIA
RWD	RWANDA
SAB	SAUDI ARABIA
SAF	SOUTH AFRICA
SBH	SABAH
SGP	SINGAPORE
SHL	ST. HELENA
SLN	SIERRA LEONE
SPN	SPAIN
SRK	SARAWAK
STZ	SWITZERLAND
SWA	SO. WEST AFRICA
SWD	SWEDEN
SYA	SYRIA
TGR	TANGIER
THL	THAILAND
TIW	TAIWAN
TNS	TUNIS
TRD	TRINIDAD
TRK	TURKEY
TZN	TANZANIA
UGD	UGANDA
UK	UNITED KINGDOM (Fuji Xerox list only)
URG	URUGUAY
USA	USA
USR	USSR
UAR	UNITED ARAB REP.
VTM	VIETNAM
VZL	VENEZUELA
YGS	YUGOSLAVIA
ZMB	ZAMBIA
ZZZ	

FOREIGN COUNTRY KEY LETTER CODE

FUJI XEROX PATENTS

Class 1A1C

3,569,803.—ELECTROPHOTOGRAPHIC PROCESS UTILIZING FRICTION CHARGING. MAR. 9, 1971. BEL. 719365, CAN. 925561, FRA. 1577647, U.K. 1232470.

3,573,905.—METHOD OF PRODUCING ELECTROPHOTOSENSITIVE CADMIUM SULFIDE WITH CRYSTALS OF A HEXAGONALITY OF LESS THAN 80%. APR. 6, 1971. BEL. 682886, CAN. 814845, FRA. 1526846, JAP. 43-16195, MEX. 93082, U.K. 1148487.

3,775,103.—ELECTROPHOTOGRAPHIC MATERIAL AND PROCESS FOR PRODUCING SAME. NOV. 27, 1973. BEL. 693919, FRA. 1511300, GER. 1,522,612, ITL. 798303, NOR. 122730, U.K. 1,183,762.

3,775,106.—ELECTROPHOTOGRAPHIC PROCESS. NOV. 27, 1973. BEL. 771855, CAN. 946465, JAP. 49-17531, U.K. 1328318.

Class 1A1F

3,705,032.—ELECTROPHOTOGRAPHIC MATERIALS. DEC. 5, 1972. AUS. 432027, BEL. 737701, CAN. 918984, FRA. 6928605, GER. 1942383, ITL. 872749, JAP. 48-2966, U.K. 1237036.

Class 1A2C

3,660,086.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS EMPLOYING INORGANIC PHOTOCONDUCTIVE MATERIAL WITH A PHOTOCHROMIC SENSITIZING AGENT. MAY 2, 1972. U.K. 1290441.

3,799,773.—ELECTROPHOTOGRAPHIC PROCESS EMPLOYING A PHOTOCHROMIC COMPOUND AND TRANSPARENT TONER. MAR. 26, 1974.

Class 1A6

3,787,235.—METHOD OF ELECTROPHOTOGRAPHIC SENSITIVE PAPER. JAN. 22, 1974. JAP. 48-1330.

Class 1C4B

3,563,733.—METHODS OF PREPARING RELIEF IMAGES BY ENZYMATIC DIGESTION. FEB. 16, 1971. BEL. 709856, CAN. 830395, FRA. 1564578, JAP. 46-11628, U.K. 1217087.

3,630,728.—ELECTROPHOTOGRAPHIC METHOD OF FORMING RELIEF IMAGES. DEC. 28, 1971. BEL. 728693, CAN. 877883, FRA. 2002.362, JAP. 46-41348, U.K, 1228509.

Class 1E

3,549,359.—COLOR ELECTROPHOTOGRAPHY EMPLOYING DYE TRANSFER FROM A DYE-CONTAINING PHOTOSENSITIVE LAYER TO AN IMAGE RECEIVING SHEET. DEC. 22, 1970. FRA. 1524473, GER. 1,572,341, JAP. 45-40159, U.K. 1,183,532.

3,615,391.—ELECTROPHOTOGRAPHIC COLOR DEVELOPING METHOD. OCT. 26, 1971. AUS. 435735, CAN. 842157, FRA. 1572518, JAP. 46-21996, U.K. 1231846, U.K. 1257609.

3,615,392.—ELECTROPHOTOGRAPHIC REPRODUCTION OF ORIGINALS CONTAINING BOTH MULTICOLOR AND LINE AREAS. OCT. 26, 1971. CAN. 902986, JAP. 46-43951.

3,654,865.—METHOD FOR FORMING DYE IMAGE USING AN ELECTROPHOTOGRAPHIC DEVELOPER CONTAINING A GELATIN TONER. APR. 11, 1972. AUS. 435812, BEL. 745534, CAN. 924.951, FRA. 7004034, ITL. 888.447, JAP. 48-9017, U.K. 1257296.

3,656,947.—CODING OF ORIGINALS AND SENSITIVE PAPER IN A MULTI-COLOR ELECTROPHOTOGRAPHIC PROCESS. APR. 18, 1972. BEL. 748591, CAN. 902987, FRA. 7012518, JAP. 48-26778, U.K. 1309644.

3,672,887.—ELECTROPHOTOGRAPHIC PROCESS FOR MULTICOLOR REPRODUCTION. JUNE 27, 1972. JAP. 47-19395.

3,687,661.—COLOR ELECTROPHOTOGRAPHIC PROCESS. AUG. 29, 1972. CAN. 925929, JAP. 48-28697.

3,689,260.—COLOR ELECTROPHOTOGRAPHIC PROCESS WITH RESIN DEPOSITION FOR STABILIZATION OF TONER IMAGE. SEPT. 5, 1972. AUS. 437666, BEL. 7531555, CAN. 927649, FRA. 7025295, ITL. 910210, JAP. 48-26779, U.K. 1279506.

3,705,767.—ELECTROPHOTOGRAPHIC DEVICE. DEC. 12, 1972. BEL. 753687, CAN. 947357, FRA. 7026800, GER. 2036140, ITL. 902477, JAP. 48-11054, U.K. 1266112.

3,779,639.—COLOR ELECTROPHOTOGRAPHIC APPARATUS. DEC. 18, 1973. U.K. 1331870.

3,785,812.—METHOD OF EXPOSURE IN MULTI-COLOR ELECTROPHOTOGRAPHY. JAN. 15, 1974. ARG. 185812, AUS. 417288, BEL. 759392, CAN. 945619, FRA. 7042329, ITL. 914549, JAP. 49-23905, U.K. 1322847.

3,806,340.—COLOR ELECTROPHOTOGRAPHIC PROCESS EMPLOYING A POLAR ORGANIC SOLVENT VAPOR. APR. 23, 1974. BEL. 774765, CAN. 946671, FRA. 7138742, JAP. 49-23905, U.K. 1322847.

Class 1F

3,473,923.—REPRODUCTION PROCESS INCLUDING TRANSFER AND REDEVELOPMENT OF ELECTROSTATICALLY FORMED IMAGES. OCT. 21, 1969. BEL. 679506, FRA. 1479592, GER. 1,522,597. JAP. 43-07586, U.K. 1152832.

3,745,002.—METHOD OF PREPARING A PRINTING MASTER BY XEROGRAPHY. JULY 10, 1973. ARG. 120543, AUS. 432568, BEL. 756.595, CAN. 903014, FRA. 2068748, JAP. 48-27362, MEX. 119463, U.K. 1314109.

3,788,845.—PROCESS FOR FORMING DYE IMAGES. JAN. 29, 1974.

Class 1G

3,764,309.—COLOR PRINTING METHOD. OCT. 9, 1973. BEL. 724581, CAN. 877884, FRA. 1595848, ITL. 848192, JAP. 46-33541, U.K. 1223020.

Class 1I

3,762,811.—METHOD AND APPARATUS FOR ELECTROPHOTOGRAPHY. OCT. 2, 1973.

3,784,301.—ELECTROPHOTOGRAPHIC BORDER APPARATUS. JAN. 8, 1974. JAP. 49-26590.

Class 1J6

3,796,187.—APPARATUS FOR DEVELOPING CONTINUOUS ELECTROPHOTOGRAPHIC PHOTOSENSITIVE WEB MATERIAL. MAR. 12, 1974. BEL. 769412, CAN. 934541, FRA. 7123852, ITL. 934462, U.K. 1332534.

Class 1K

3,408,217.—FINGERPRINT RECORDING. OCT. 29, 1968. JAP. 41-21520, U.K. 1095572.

3,492,140.—METHOD OF RECORDING FINGERPRINTS OF HUMAN BODY. JAN. 7, 1970. FRA. 1386116, JAP. 39-27575, U.K. 1063635.

Class 1K3

3,745,002.—METHOD OF PREPARING A PRINTING MASTER BY XEROGRAPHY. JULY 10, 1973. ARG. 120543, AUS. 432568, BEL. 756.595, CAN. 903014, FRA. 2068748, JAP. 48-27362, MEX. 119463, U.K. 1314109.

Class 2A1E

3,506,595.—PHOTOCONDUCTIVE INSULATING MATERIALS. APR. 14, 1970. FRA. 1498064, GER. 1,522,606, JAP. 43-24394, U.K. 1148537.

3,615,401.—PROCESS FOR THE PREPARATION OF PHOTOCONDUCTIVE LIGHT-SENSITIVE MATERIALS COMPRISING CdS OR CdS.N $CdCo_2$. OCT. 26, 1971. FRA. 2001257, JAP. 47-40819, U.K. 1239129.

3,615,410.—ELECTROPHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL CONTAINING A PROTEASE ENZYME. OCT. 26, 1971. BEL. 730415, CAN. 885386, FRA. 2004.940, U.K. 1224711.

Class 2A1E1

3,385,699.—PROCESS FOR PROCESSING ELECTROPHOTOSENSITIVE LAYERS. MAY 28, 1968. BEL. 651039, FRA. 1402385, HOL. 130806, SWD. 310458, U.K. 1072476.

3,494,766.—LIGHT SENSITIVE LAYER FOR ELECTROPHOTOGRAPHY. FEB. 10. 1970. CAN. 791648, FRA. 1460449, NOR. 112288, SWD. 226000, U.K. 1085939.

3,494,789.—PHOTOCONDUCTIVE INSULATING MATERIAL. FEB. 10, 1970. CAN. 813830, FRA. 1564467, ITL. 788829, JAP. 44-10631, MEX. 88112, U.K. 1120091.

3,615,410.—ELECTROPHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL CONTAINING A PROTEASE ENZYME. OCT. 26, 1971. BEL. 730415, CAN. 885386, FRA. 2004.940, U.K. 1224711.

3,634,333.—PROCESS FOR COATING ZINC OXIDE POWDER WITH CADMIUM SULFIDE. JAN. 11, 1972. BEL. 731056, CAN. 882.627, FRA. 2.005.849, GER. 1916761, JAP. 47-49616, U.K. 1215685.

3,660,086.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS EMPLOYING INORGANIC PHOTOCONDUCTIVE MATERIAL WITH A PHOTOCHROMIC SENSITIZING AGENT. MAY 2, 1972. U.K. 1290441.

3,674,476.—PROCESS FOR PRODUCING PHOTOCONDUCTIVE LAYER FOR ELECTROPHOTOGRAPHY. JULY 4, 1972. BEL. 751.676, CAN. 918481, FRA. 2051030, U.K. 1264719.

3,689,260.—COLOR ELECTROPHOTOGRAPHIC PROCESS WITH RESIN DEPOSITION FOR STABILIZATION OF TONER IMAGE. SEPT. 5, 1972. AUS. 437666, BEL. 753155, CAN. 927649, FRA. 7025295, ITL. 910210, JAP. 48-26779, U.K. 1279506.

3,707,392.—METHOD OF SENSITIZATION OF AN ELECTROPHOTOGRAPHIC MATERIAL. DEC. 26, 1972. AUS. 444836, BEL. 744600, CAN. 888125, FRA. 7001955, GER. 2002607, ITL. 892368, JAP. 48-7814, U.K. 1257154.

3,725,060.—HEMATEIN OR HEMATOXYLIN-CONTAINING ZINC OXIDE PHOTOCONDUCTIVE LAYERS. APR. 3, 1973. JAP. 49-4340.

3,761,261.—PHTHALOCYANINE DYE SENSITIZERS FOR ZINC OXIDE. SEPT. 25, 1973. JAP. 45-990335.

Class 2A1F

3,394,001.—ELECTROPHOTOGRAPHIC SENSITIVE CONTAINING ELECTRON DONOR DYE LAYERS. JULY 23, 1968. JAP. 44-15758, U.K. 1,106,562.

3,476,659.—ELECTROPHOTOGRAPHIC IMAGING AND COPYING PROCESS. NOV. 4, 1969. BEL. 684406, FRA. 1489929, ITL. 773333, JAP. 43-27579, U.K. 1159394.

3,654,865.—METHOD FOR FORMING DYE IMAGE USING AN ELECTROPHOTOGRAPHIC DEVELOPER CONTAINING A GELATIN TONER. APR. 11, 1972. AUS. 435812, BEL. 745534, CAN. 924.951, FRA. 7004034, ITL. 888.447, JAP. 48-9017, U.K. 1257296.

3,704,123.—DYE SENSITIZED PHOTOCONDUCTIVE MATERIAL. NOV. 28, 1972. AUS. 424510, BEL. 720260, CZC. 142206, FRA. 1568416, GER. 1772210, ITL. 831114, JAP. 47-20753, U.K. 1190676, USR. 374866.

3,705,032.—ELECTROPHOTOGRAPHIC MATERIALS. DEC. 5, 1972. AUS. 432027, BEL. 737701, CAN. 918984, FRA. 6928605, GER. 1942383, ITL. 872749, JAP. 48-2966, U.K. 1237036.

3,707,392.—METHOD OF SENSITIZATION OF AN ELECTROPHOTOGRAPHIC MATERIAL. DEC. 26, 1972. AUS. 444836, BEL. 744600, CAN. 888125, FRA. 7001955, GER. 2002607, ITL. 892368, JAP. 48-7814, U.K. 1257154.

Class 2A1G

3,541,028.—PHOTOCONDUCTIVE INSULATING MATERIALS. NOV. 17, 1970. FRA. 1494699, GER. 1,522,605, JAP. 43-14494, U.K. 1128417.

Class 2A2

3,647,428.—PHOTOCONDUCTIVE MATERIAL FOR ELECTROPHOTOGRAPHY. MAR. 7, 1972. AUS. 429949, BEL. 759550, CAN. 924162, FRA. 2072521, ITL. 923181, JAP. 48-4316, U.K. 1269429.

3,704,119.—ELECTROPHOTOGRAPHIC PROCESS USING TONER OF SAME REFRACTIVE INDEX AS ORGANIC PHOTOCONDUCTIVE LAYER. NOV. 28, 1972. AUS. 433360, BEL. 754544, FRA. 7028556, ITL. 902771, JAP. 48-21054, U.K. 1321065.

Class 2A2A

3,707,369.—PHOTOCONDUCTIVE ELEMENTS CONTAINING 2-METHYL-3, 3-DIMETHYL INDOLE DERIVATIVES. DEC. 26, 1972. BEL. 754969, CAN. 898823, FRA. 703049, GER. 2041490, U.K. 1268889.

Class 2B

3,394,001.—ELECTROPHOTOGRAPHIC SENSITIVE MATERIAL CONTAINING ELECTRON-DONOR DYE LAYERS. JULY 23, 1968. JAP. 44-15758, U.K. 1,106,562.

3,656,949.—METHOD OF PRODUCING AN ELECTROPHOTOGRAPHIC AND ELECTROGRAPHIC RECORDING MEMBER. APR. 18, 1972. BEL. 734288, CAN. 890875, FRA. 6919148, GER. 1929162, JAP. 48-787, U.K. 1259158.

3,704,121.—ELECTROPHOTOGRAPHIC REPRODUCTION PROCESS USING A DUAL LAYERED PHOTORECEPTOR. NOV. 28, 1972. BEL. 739153, FRA. 6932116, ITL. 890989, JAP. 49-25218, SPN. 371685, STZ. 519188, U.K. 1272131.

4,023,181.—RECORDING MEDIUM CONDUCTIVE ELECTRODE. MAY 10, 1977. JAP. 49-91720.

Class 2B1

3,574,682.—ELECTROSTATIC RECORDING MATERIALS. APR. 13, 1971. U.K. 1213395.

3,787,235.—METHOD OF ELECTROPHOTOGRAPHIC SENSITIVE PAPER. JAN. 22, 1974. JAP. 48-1330.

Class 2B2

3,552,956.—METHOD FOR TREATING ELECTROPHOTOGRAPHIC RECORDING MATERIALS WITH PROTECTIVE OVERCOATINGS. JAN. 5, 1971. BEL. 693184, FRA. 1508918, SWD. 326372, U.K. 1155665.

3,717,461.—REMOVAL OF PROTECTIVE RESIN LAYER BY LIQUID DEVELOPER IN ELECTROPHOTOGRAPHIC IMAGING. FEB. 20, 1973. ARG. 182091, AUS. 428797, BEL. 762.808, CAN. 929016, FRA. 2078511, ITL. 919801, MEX. 120941, U.K. 1326300.

Class 2B4

3,428,453.—IMAGING FORMING PROCESS UTILIZING XEROGRAPHY. FEB. 18, 1969. FRA. 1,428,775, ITL. 754,825, JAP. 43-02622, U.K. 1,085,151.

Class 2E

3,417,733.—APPARATUS FOR VACUUM COATING. DEC. 24, 1968. FRA. 1,415,251, GER. 1,521,238, JAP. 40-26402, U.K. 1,081,324.

3,573,905.—METHOD OF PRODUCING ELECTROPHOTOSENSITIVE CADMIUM SULFIDE WITH CRYSTALS OF A HEXAGONALITY OF LESS THAN 80% APR. 6, 1971. BEL. 682886, CAN. 814845, FRA. 1526846, JAP. 43-16195, MEX. 93082, U.K. 1148487.

3,656,949.—METHOD OF PRODUCING AN ELECTROPHOTOGRAPHIC AND ELECTOGRAPHIC RECORDING MEMBER. APR. 18, 1972. BEL. 734288, CAN. 890875, FRA. 6919148, GER. 1929162, JAP. 48-787, U.K. 1259158.

3,672,988.—METHOD OF MANUFACTURING BASES FOR ELECTROSTATIC RECORDING MATERIAL OR ELECTROPHOTOGRAPHIC MATERIAL. JUNE 27, 1972. AUS. 437336, BEL. 746420, CAN. 898621, GER. 2008636, ITL. 888758, JAP. 47-45549, U.K. 1301926.

3,674,476.—PROCESS FOR PRODUCING PHOTOCONDUCTIVE LAYER FOR ELECTROPHOTOGRAPHY. JULY 4, 1972. BEL. 751.676, CAN. 918481, FRA. 2051030, U.K. 1264719.

3,772,173.—ELECTROCONDUCTIVE PAPER. NOV. 13, 1973. CAN. 930693, JAP. 48-15037, U.K. 1329569.

3,775,103.—ELECTROPHOTOGRAPHIC MATERIAL AND PROCESS FOR PRODUCING SAME. NOV. 27, 1973. BEL. 693919, FRA. 1511300, GER. 1522612, ITL. 798303, NOR. 122730, U.K. 1183762.

3,927,638.—VACUUM EVAPORATION PLATING APPARATUS. DEC. 23, 1975.

3,984,585.—VACUUM EVAPORATION PLATING METHOD. MAY 5, 1976. FRA. 7422500, GER. P-2430653.4, JAP. 48-72263, U.K. 1,214,698.

Class 2F

3,998,548.—SENSITIVE DRUM RECEIVING DEVICE FOR USE IN ELECTROPHOTOGRAPHIC REPRODUCING MACHINE. DEC. 21, 1976. JAP. 49-94060, U.K. 32984/75.

Class 3

3,764,207.—ELECTROPHOTOGRAPHIC PROCESS UTILIZING SINGLE CHARGING MEANS FOR EFFECTING SIMULTANEOUS FUNCTIONS OF CHARGING AND FACILITATING TONER IMAGE TRANSFER. OCT. 9, 1973.

Class 3C

3,612,864.—IMAGING SYSTEM UTILIZING AN ELECTRODE TREATED WITH A MIXTURE OF A HYGROSCOPIC MATERIAL AND A HYDROPHILIC BINDER. OCT. 12, 1971. BEL. 726690, CAN. 885615, JAP. 47-12440.

3,775,106.—ELECTROPHOTOGRAPHIC PROCESS. NOV. 27, 1973. BEL. 771855, CAN. 946465, JAP. 49-17531, U.K. 1328318.

Class 3C1

3,772,173.—ELECTROCONDUCTIVE PAPER. NOV. 13, 1973. CAN. 930693, JAP. 48-15037, U.K. 1329569.

Class 3C3

3,649,830.—UNIFORM CHARGING METHOD AND APPARATUS USING AN ARRAY OF NEEDLE ELECTRODES. MAR. 14, 1972. CAN. 940590, JAP. 48-28301, U.K. 1279758.

3,655,966.—ELECTRIC CHARGING DEVICE FOR ELECTROPHOTOGRAPHY. APR. 11, 1972. CAN. 922359, JAP. 48-25942, U.K. 1323599.

Class 3C4

3,719,481.—ELECTROSTATOGRAPHIC IMAGING PROCESS. MAR. 6, 1973. CAN. 948693, FRA. 7108391, ITL. 921208, U.K. 1281149.

Class 3C5

3,715,640.—CORONA CHARGING PROCESS AND APPARATUS IN ELECTROPHOTOGRAPHY. FEB. 6, 1973. AUS. 425637, BEL. 765716, CAN. 927473, FRA. 71131128, ITL. 923947, JAP. 49-17379, U.K. 1338691.

3,779,749.—METHOD OF CHARGING IN ELECTROPHOTOGRAPHY. DEC. 18, 1973. BEL. 772412, CAN. 9481495, FRA. 7132246, ITL. 942080, JAP. 49-17532, U.K. 1359182.

3,788,844.—CHARGING METHOD FOR ELECTROPHOTOGRAPHY. JAN. 29, 1974. JAP. 49-13025, U.K. 1344908.

3,789,222.—CORONA CHARGE METHOD. JAN. 29, 1974. BEL. 771311, CAN. 943180, FRA. 7129655, ITL. 933902, JAP. 49-17530.

3,789,224.—PROCESS FOR CHARGING ELECTROPHOTOGRAPHIC MATERIALS. JAN. 29, 1974. AUS. 435928, BEL. 772465, CAN. 945834, FRA. 7132445, ITL. 938023, JAP. 49-23902, U.K. 1359181.

Class 3C9

3,582,731.—CHARGING SYSTEM. JUNE 1, 1971. CAN. 906045, JAP. 46-30636.

Class 3D

3,546,545.—METHOD OF CHARGING A PHOTOCONDUCTIVE INSULATING LAYER. DEC. 8, 1970. BEL. 721040, FRA. 1586221, U.K. 1205297.

3,569,803.—ELECTROPHOTOGRAPHIC PROCESS UTILIZING FRICTION CHARGING. MAR. 9, 1971. BEL. 719365, CAN. 925561, FRA. 1577647, U.K. 1232470.

Class 3E

3,704,121.—ELECTROPHOTOGRAPHIC REPRODUCTION PROCESS USING A DUAL LAYERED PHOTORECEPTOR. NOV. 28, 1972. BEL. 739153, FRA. 6932116, ITL. 890989, JAP. 49-25218, SPAN. 371685, STZ. 519188, U.K. 1272131.

3,715,640.—CORONA CHARGING PROCESS AND APPARATUS IN ELECTROPHOTOGRAPHY. FEB. 6, 1973. AUS. 425637, BEL. 765716, CAN. 927473, FRA. 71131128, ITL. 923947, JAP. 49-17379, U.K. 1338691.

Class 3F

3,749,927.—ELECTROSTATIC CHARGING PROCESS FOR ELECTROPHOTOSENSITIVE MATERIAL. JULY 31, 1973. AUS. 435008, BEL. 469413, FRA. 7123717, ITL. 934461, JAP. 49-16060, U.K. 1316047.

3,778,148.—APPARATUS AND METHOD FOR SELECTIVELY DISCHARGING THE PHOTOCONDUCTIVE SURFACE OF AN ELECTROSTATIC DRUM COPIER TO FACILITATE THE CLEANING THEREOF. DEC. 11, 1973.

3,778,623.—CHARGING METHOD OF ELECTROPHOTOGRAPHIC MATERIALS. DEC. 11, 1973. FRA. 7229549.

3,789,223.—CHARGING METHOD FOR RELATIVELY MOVABLE ELECTROPHOTOGRAPHIC MEANS AND CORONA MEANS. JAN. 29, 1974. AUS. 431512, BEL. 771143, FRA. 7129349, ITL. 935108, JAP. 49-17529, U.K. 1347100.

3,789,224.—PROCESS FOR CHARGING ELECTROPHOTOGRAPHIC MATERIALS. JAN. 29, 1974. AUS. 435928, BEL. 772465, CAN. 945834, FRA. 7132445, ITL. 938023, JAP. 49-23902, U.K. 1359181.

Class 4A

3,741,644.—ORIGINAL POSITION CONFIRMING MEANS FOR DUPLICATING APPARATUS. JUNE 26, 1973.

Class 4A1

3,771,082.—COPYING APPARATUS WITH AUXILIARY LIGHT SOURCE FOR ILLUMINATING AN ORIGINAL TO BE REPRODUCED. NOV. 6, 1973. U.K. 1350616.

3,841,7[illegible]2.—LIGHT SOURCE FOR COPYING MACHINE. OCT. 15, 1974.

Class 4A2

3,737,223.—PLATEN DRIVING DEVICE IN AN ELECTROPHOTOGRAPHIC COPYING MACHINE. JUNE 5, 1973. U.K. 1341619.

Class 4B

3,687,661.—COLOR ELECTROPHOTOGRAPHIC PROCESS. AUG. 29, 1972. ARG. 182081, BEL. 759454, CAN. 932785, FRA. 7043828, ITL. 909538, JAP. 49-18265, U.K. 1327486.

3,784,301.—ELECTROPHOTOGRAPHIC BORDER APPARATUS. JAN. 8, 1974. JAP. 49-26590.

3,785,812.—METHOD OF EXPOSURE IN MULTI-COLOR ELECTROPHOTOGRAPHY. JAN. 15, 1974. ARG. 185812, AUS. 417288, BEL. 759392, CAN. 945619, FRA. 7042329, ITL. 914549, JAP. 49-11573, U.K. 1326580.

Class 4B1

3,927,940.—MANUSCRIPT SCANNING DEVICE FOR COPYING MACHINES AND THE LIKE. DEC. 23, 1975.

3,955,048.—SCANNING METHOD AND APPARATUS. MAY 4, 1976.

Class 4B1A

3,778,153.—OPTICAL IMAGING SYSTEM. DEC. 11, 1973.

Class 4B7

3,313,883.—SYSTEMS FOR RECORDING CHARACTERS ON LIGHT SENSITIVE RECORDING SURFACES. AUG. 25, 1964. CAN. 693,055, FRA. 1,246,197, GER. 1,449,634, JAP. 318,009.

3,615,391.—ELECTROPHOTOGRAPHIC COLOR DEVELOPING METHOD. OCT. 26, 1971. AUS. 435735, CAN. 842157, FRA. 1572518, JAP. 46-21996, U.K. 1231846, U.K. 1257609.

3,656,947.—CODING OF ORIGINALS AND SENSITIVE PAPER IN A MULTI-COLOR ELECTROPHOTOGRAPHIC PROCESS. APR. 18, 1972. BEL. 748591, CAN. 902987, FRA. 7012518, JAP. 48-26778, U.K. 1309644.

Class 5A1A

3,451,376.—DEVELOPING DEVICE FOR ELECTROPHOTOGRAPHY. JUNE 24, 1969. AUS. 410555, FRA. 1556520, SWD. 319382, U.K. 1173377.

Class 5A2

3,418,972.—POWDER DUSTING DEVICE FOR ELECTROPHOTOGRAPHY. DEC. 31, 1968. FRA. 1544620, JAP. 45-8838, U.K. 1169410.

Class 5A3B

3,418,972.—POWDER DUSTING DEVICE FOR ELECTROPHOTOGRAPHY. DEC. 31, 1968. FRA. 1544620, JAP. 45-8838, U.K. 1169410.

Class 5A4

3,681,065.—DYE TRANSFER COLOR ELECTROPHOTOGRAPHY. AUG. 1, 1972. CAN. 884,227, JAP. 44-32208.

Class 5A5

3,620,800.—CLEANING LIQUID DEVELOPED ELECTROSTATIC IMAGES BY CONTACT WITH VAPORIZED CLEANING FLUID. NOV. 16, 1971. CAN. 915753, CAN. 933997, JAP. 48-13454.

Class 5C

3,927,641.—DEVELOPING MECHANISM USING MAGNETIC BRUSH. DEC. 23, 1975.

3,937,181.—MAGNETIC BRUSH TYPE DEVELOPING MECHANISM IN ELECTROPHOTOGRAPHIC COPYING MACHINE. FEB. 10, 1976.

Class 5C1

3,545,968.—DEVELOPING A LATENT ELECTROSTATIC IMAGE WITH FERROMAGNETIC CARRIER AND TONER BY EMPLOYING A VARYING MAGNETIC FIELD. DEC. 8, 1970. BEL. 710692, FRA. 1561470, U.K. 1205175.

3,908,595.—MAGNETIC BRUSH DEVELOPMENT APPARATUS UTILIZING MAGNETIC MEANS. SEPT. 30, 1975.

3,977,361.—MAGNETIC BRUSH DEVELOPMENT DEVICE. AUG. 31, 1976. GER. P2521275.3, JAP. 49-52302, KOR. 3670, TIW. 6410622, U.K. 19955-75.

3,981,271.—MAGNETIC BRUSH TYPE DEVELOPER FOR USE IN AN ELECTROPHOTOGRAPHIC MACHINE. SEPT. 21, 1976. GER. P25073910, JAP. 49-19615, U.K. 6841-75.

3,985,099.—MAGNETIC BRUSH DEVELOPING DEVICE. OCT. 12, 1976. GER. P2521291.3 JAP. 52303, KOR. 3669, TIW. 6410736, U.K. 19951-75.

Class 5C2

3,672,887.—ELECTROPHOTOGRAPHIC PROCESS FOR MULTICOLOR REPRODUCTION. JUNE 27, 1972. JAP. 47-19395.

3,764,309.—COLOR PRINTING METHOD. OCT. 9, 1973. BEL. 724581, CAN. 877884, FRA. 1595848, ITL. 848192, JAP. 46-33541, U.K. 1223020.

Class 5D1

3,783,818.—ELECTROPHOTOGRAPHIC DEVELOPING PROCESS. JAN. 8, 1974. BEL. 781515, FRA. 7211409, ITL. 950927, U.K. 1358450.

Class 5D2

3,336,904.—XEROGRAPHIC DEVELOPING APPARATUS. AUG. 22, 1967. BEL. 651786, GER. 1,472,946, HOL. 132649, JAP. 40-23755, U.K. 1068575.

Class 5D3

3,804,659.—ELECTROPHOTOGRAPHIC REVERSAL DEVELOPMENT PROCESS FOR ENHANCING THE QUALITY OF THE DEVELOPED IMAGE. APR. 16, 1974. FRA. 7144069, JAP. 49-26901.

Class 5E

3,540,885.—REDUCTION OF FOG FORMATION IN AN ELECTROPHOTOGRAPHIC LIGHT SENSITIVE SHEET. NOV. 17, 1970. BEL. 693302, FRA. 1509571, JAP. 44-2551, U.K. 1176001.

3,560,203.—ELECTROPHOTOGRAPHIC DEVELOPING PROCESS. FEB. 2, 1971. FRA. 1604137, U.K. 1165038.

3,566,834.—ELECTROPHOTOGRAPHIC DEVELOPING DEVICE. MAR. 2, 1971. AUS. 417201, BEL. 718329, FRA. 1578391, JAP. 48-31853, U.K. 1194789.

3,622,515.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPER HAVING A PROTEOLYTIC ENZYME. NOV. 23, 1971. AUS. 436813, BEL. 732273, CAN. 896948, FRA. 2007.520, ITL. 867188, JAP. 47-17879, U.K. 1231544.

3,627,557.—LIQUID DEVELOPMENT BY REDUCING THE VISCOSITY OF THE DEVELOPER ON A ROLLER APPLICATION PRIOR TO DEVELOPMENT. DEC. 14, 1971. CAN. 905230, U.K. 1303499.

3,628,981.—LIQUID TONER DEVELOPMENT. DEC. 21, 1971. BEL. 751669, CAN. 902982, FRA. 7021033, ITL. 893939, JAP. 48-18859, U.K. 1284477.

3,642,515.—LIQUID DEVELOPMENT UTILIZING A CURVILINEAR DEVELOPMENT ELECTRODE. FEB. 15, 1972. CAN. 867698.

3,668,126.—METHOD OF PRODUCING ELECTROPHOTOGRAPHIC LIQUID DEVELOPERS HAVING VERY FINE COLORING MATERIAL. JUNE 6, 1972. BEL. 709625, FRA. 1562934, U.K. 1218064.

3,671,290.—IMAGING SYSTEM. JUNE 20, 1972. CAN. 917486, JAP. 48-8134, U.K. 1278858.

3,685,907.—ELECTROPHOTOGRAPHIC PROCESS. AUG. 22, 1972. ARG. 181932, AUS. 442703, BEL. 752387, CAN. 910132, FRA. 2-51297, ITL. 902170, MEX. 116451, U.K. 1292200.

3,692,523.—PROCESS FOR DEVELOPING ELECTROSTATIC LATENT IMAGE AND LIQUID DEVELOPER USED THEREFOR. SEPT. 19, 1972. AUS. 437065, BEL. 745533, CAN. 924.167, FRA. 7040233, GER. 20052680, ITL. 888.449, JAP. 48-7821, U.K. 1255445.

3,703,400.—DEVELOPING METHOD FOR ELECTROPHOTOGRAPHY. NOV. 21, 1972. AUS. 435816, BEL. 748.590, CAN. 898073, FRA. 7012445, GER. 2016586, ITL. 903950, U.K. 1251623.

3,705,032.—ELECTROPHOTOGRAPHIC MATERIALS. DEC. 5, 1972. AUS. 432027, BEL. 737701, CAN. 918984, FRA. 6928605, GER. 1942383, ITL. 872749, JAP. 48-2966, U.K. 1237036.

3,705,767.—ELECTROPHOTOGRAPHIC DEVICE. DEC. 12, 1972. BEL. 753687, CAN. 947357, FRA. 7026800, GER. 2036140, ITL. 902477, JAP. 48-11054, U.K. 1266112.

3,707,139.—LIQUID TYPE ELECTROPHOTOGRAPHY DEVELOPING APPARATUS. DEC. 26, 1972. BEL. 756409, CAN. 918413, FRA. 7034577, GER. 1314865.

3,713,422.—APPARATUS FOR DEVELOPING AN ELECTROSTATIC LATENT IMAGE BY LIQUID DEVELOPMENT. JAN. 30, 1973. BEL. 764267, CAN. 932954, FRA. 7109086, GER. 763,992, U.K. 1341631.

3,716,360.—MOLTEN IMAGE TRANSFER IN ELECTROPHOTOGRAPHY. FEB. 13, 1973. BEL. 763191, FRA. 7105717, GER. 2108080, ITL. 919905, U.K. 1313059.

3,717,461.—REMOVAL OF PROTECTIVE RESIN LAYER BY LIQUID DEVELOPER IN ELECTROPHOTOGRAPHIC IMAGING. FEB. 20, 1973. ARG. 182091, AUS. 428797, BEL. 762808, CAN. 929016, FRA. 2078511, ITL. 919801, MEX. 120941, U.K. 1326300.

3,718,593.—PROCESS FOR THE PRODUCTION OF AN ELECTROPHOTOGRAPHIC LIQUID DEVELOPER CONTAINING GELATIN. FEB. 27, 1973. AUS. 438586, BEL. 745535, CAN. 924166, FRA. 7004034, ITL. 888743, JAP. 48-7822, U.K. 1255763.

3,738,832.—COLOR ELECTROPHOTOGRAPHIC PROCESS EMPLOYING LIQUID DEVELOPER CONTAINING GELATIN. JUNE 12, 1973. CAN. 921746, JAP. 47-30858, U.K. 1277723.

3,749,059.—APPARATUS FOR DEVELOPING ELECTROSTATIC LATENT IMAGE. JULY 31, 1973. AUS. 445683, BEL. 755061, CAN. 903579, FRA. 7029636, JAP. 48-25936, U.K. 1267888.

3,750,624.—APPARATUS FOR DEVELOPING ELECTROPHOTOGRAPHIC CONTINUOUS WEB MATERIAL. AUG. 7, 1973. AUS. 433381, BEL. 770250, CAN. 948843, FRA. 7126524, ITL. 948843, U.K. 1328313.

3,753,419.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPING APPARATUS. AUG. 21, 1973. AUS. 430772, BEL. 768788, CAN. 334540, FRA. 7122426, ITL. 928531, U.K. 1337485.

3,766,887.—DEVELOPING DEVICE FOR ELECTROSTATIC LATENT IMAGE. OCT. 28, 1973. AUS. 429869, BEL. 761227, CAN. 102437, FRA. 2075270, ITL. 919235, U.K. 1310092.
3,774,574.—DEVELOPMENT DEVICE FOR ELECTROPHOTOGRAPHY. NOV. 27, 1973. FRA. 7143873.
3,783,827.—LIQUID DEVELOPMENT APPARATUS FOR ELECTROPHOTOGRAPHY. JAN. 8, 1974. BEL. 777528, CAN. 949309, FRA. 7147339, ITL. 945720.
3,784,397.—IMAGING SYSTEM. JAN. 8, 1974. ARG. 185194, JAP. 1348667, MEX. 120938.
3,788,930.—METHOD OF FIXING IMAGES OBTAINED BY LIQUID DEVELOPMENT IN ELECTROPHOTOGRAPHY. JAN. 29, 1974. BEL. 774763.
3,796,187.—APPARATUS FOR DEVELOPING CONTINUOUS ELECTROPHOTOGRAPHIC PHOTOSENSITIVE WEB MATERIAL. MAR. 12, 1974. BEL. 769412, CAN. 934541, FRA. 7123852, ITL. 934462, U.K. 1332534.
3,804,659.—ELECTROPHOTOGRAPHIC REVERSAL DEVELOPMENT PROCESS FOR ENHANCING THE QUALITY OF THE DEVELOPED IMAGE. APR. 16, 1974. FRA. 7144069, JAP. 49-26901.
3,817,212.—ELECTROSTATOGRAPHIC LIQUID DEVELOPMENT APPARATUS. JUNE 18, 1974. U.K. 1310448.
3,836,384.—IMAGING SYSTEMS. SEPT. 17, 1974. JAP. 46-43198.
3,991,711.—ELECTROSTATIC DUPLICATING METHOD AND APPARATUS UTILIZING WET DEVELOPING. NOV. 16, 1976. FRA. 733636, GER. 2350429, JAP. 47-101120, U.K. 1,443,209.
4,029,826.—ELECTROSTATIC PRINTING METHOD. JUNE 14, 1977. FRA. 7434015, GER. P2448211.9, JAP. 48-112875, U.K. 43016-74.

Class 5E4

3,577,259.—LIQUID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGES UTILIZING A TOWER-FREE ZONE. MAY 4, 1971. AUS. 418640, CAN. 871081, FRA. 1592038, JAP. 46-11633, U.K. 1252917.
3,592,678.—LIQUID DONOR DEVELOPMENT WITH ELECTROPHORETIC CLEANING. JULY 13, 1971. CAN. 939733, JAP. 48-34774, U.K. 1261752.
3,597,368.—LIQUID DEVELOPER FOR ELECTROPHOTOGRAPHY CONTAINING YELLOW PIGMENT. AUG. 3, 1971. BEL. 719289, CAN. 846.122, FRA. 1578390, JAP. 46-10480, U.K. 1201134.

Class 5I1

3,537,427.—ELECTROSTATIC LATENT IMAGE DEVELOPING DEVICE. NOV. 3, 1930. BEL. 722040, JAP. 46-14440, U.K. 1239635.
3,607,342.—METHOD OF DEVELOPMENT OF ELECTROSTATIC IMAGES. SEPT. 21, 1971. BEL. 707253, FRA. 1555753, JAP. 44-9878, U.K. 1204548.
3,627,557.—LIQUID DEVELOPMENT BY REDUCING THE VISCOSITY OF THE DEVELOPER ON A ROLLER APPLICATION PRIOR TO DEVELOPMENT. DEC. 14, 1971. CAN. 905230, U.K. 1303499.

Class 5J

3,713,422.—APPARATUS FOR DEVELOPING AN ELECTROSTATIC LATENT IMAGE BY LIQUID DEVELOPMENT. JAN. 30, 1973. BEL. 764267, CAN. 932954, FRA. 7109086, GER. 763,992, U.K. 1341631.
3,750,624.—APPARATUS FOR DEVELOPING ELECTROPHOTOGRAPHIC CONTINUOUS WEB MATERIAL. AUG. 7, 1973. AUS. 433381, BEL. 770250, CAN. 948843, FRA. 7126524, ITL. 937783, U.K. 1328313.

Class 5J1

3,620,798.—DEVELOPMENT OF LATENT ELECTROSTATIC IMAGE EMPLOYING NOVEM DEVELOPMENT ELECTRODE. NOV. 16, 1971. BEL. 709410, FRA. 1552425, U.K. 1186841.
3,642,515.—LIQUID DEVELOPMENT UTILIZING A CURVILINEAR DEVELOPMENT ELECTRODE. FEB. 15, 1972. CAN. 867698.
3,655,419.—ELECTROPHOTOGRAPHIC REVERSAL DEVELOPING PROCESS. APR. 11, 1972. AUS. 432643, BEL. 741.440, CAN. 914.518, FRA. 6938659, ITL. 880.593, U.K. 1287.903.
3,685,907.—ELECTROPHOTOGRAPHIC PROCESS. AUG. 22, 1972. AUS. 442703, BEL. 752387, CAN. 910132, FRA. 2-51297, ITL. 902170, U.K. 1292200.
3,783,827.—LIQUID DEVELOPMENT APPARATUS FOR ELECTROPHOTOGRAPHY. JAN. 8, 1974. BEL. 777528, CAN. 949309, FRA. 7147339, ITL. 945720.
3,836,384.—IMAGING SYSTEMS. SEPT. 17, 1974. JAP. 46-43198.

Class 5J2

3,774,574.—DEVELOPMENT DEVICE FOR ELECTROPHOTOGRAPHY. NOV. 27, 1973. FRA. 7143873.
3,784,397.—IMAGING SYSTEM. JAN. 8, 1974. ARG. 185194, MEX. 120938, U.K. 1348667.

Class 5J3

3,566,834.—ELECTROPHOTOGRAPHIC DEVELOPING DEVICE. MAR. 2, 1971. AUS. 417201, BEL. 718329, FRA. 1578391, JAP. 48-31853, U.K. 1194789.
3,672,330.—APPARATUS FOR DEVELOPING A LATENT ELECTROSTATIC IMAGE. JUNE 27, 1972. BEL. 708760, FRA. 149128, U.K. 1192600.

Class 5J5

3,560,203.—ELECTROPHOTOGRAPHIC DEVELOPING PROCESS. FEB. 2, 1971. FRA. 1604137, U.K. 1165038.
3,783,818.—ELECTROPHOTOGRAPHIC DEVELOPING PROCESS. JAN. 8, 1974. BEL. 781515, FRA. 7211409, ITL. 950927, U.K. 1358450.
3,784,397.—IMAGING SYSTEM. JAN. 8, 1974. ARG. 185194, MEX. 120938, U.K. 1348667.
3,981,268.—DEVICE FOR CONTROLLING ELECTRIC POTENTIAL APPLIED TO DEVELOPING ELECTRODE IN AN ELECTROPHOTOGRAPHIC DUPLICATOR. SEPT. 21, 1976. GER. P2526802.4, JAP. 49-47554, KOR. 3672, TIW. 6410621, U.K. 24745-75.

Class 5K

3,724,941.—ELECTROPHOTOGRAPHIC APPARATUS. APR. 3, 1973.
3,762,811.—METHOD AND APPARATUS FOR ELECTROPHOTOGRAPHY. OCT. 2, 1973.

Class 5M

3,620,798.—DEVELOPMENT OF LATENT ELECTROSTATIC IMAGE EMPLOYING NOVEM DEVELOPMENT ELECTRODE. NOV. 16, 1971. BEL. 709410, FRA. 1552425, U.K. 1186841.
3,655,419.—ELECTROPHOTOGRAPHIC REVERSAL DEVELOPING PROCESS. APR. 11, 1972. AUS. 432643, BEL. 471.440, CAN. 914.518, FRA. 6938659, ITL. 880.593, U.K. 1287.903.
3,773,507.—ELECTROPHOTOGRAPHIC REVERSAL DEVELOPMENT PROCESS EMPLOYING A PRETONER. NOV. 20, 1973. AUS. 426720, BEL. 769893, CAN. 947812, FRA. 7124853, ITL. 934605, JAP. 49-5465, U.K. 1340947.

Class 5N

3,764,312.—ELECTROPHOTOGRAPHIC PROCESS. OCT. 9, 1973. FRA. 7146405, JAP. 49-26903.

Class 5N2B

4,020,192.—XEROGRAPHIC REPRODUCTION PROCESS AND TONER CARRIER FOR USE THEREIN. APR. 26, 1977. FRA. 7430644, GER. P2443013.1, JAP. 48-101085, U.K. 39509.

Class 5N5

3,941,898.—DEVELOPING METHOD UTILIZING PULVERIZED, COLORED, CROSSLINKED, VINYLIC POLYMER RESIN AS TONER. MAR. 2, 1976.

Class 5O

3,476,659.—ELECTROPHOTOGRAPHIC IMAGING AND COPYING PROCESS. NOV. 4, 1969. BEL. 684406, FRA. 1489929, ITL. 773333, JAP. 43-27579, U.K. 1159394.
3,565,613.—ELECTROLYTIC ELECTROPHOTOGRAPHY. FEB. 23, 1971. GER. 1597849, JAP. 44-13679, U.K. 1202409.

Class 6B1

3,791,643.—CHAIN DELIVERY PAPER FEEDING DEVICE. FEB. 12, 1974. JAP. 48-20232.

3,927,877.—PAPER FEED TRAY FOR USE WITH COPYING MACHINE AND THE LIKE. DEC. 23, 1975.

Class 6C

3,901,427.—COPY PAPER FEEDER. AUG. 26, 1975.

Class 6D

3,924,848.—PAPER FEED APPARATUS FOR GRIPPER-TYPE PAPER TRANSPORT DEVICE. DEC. 9, 1975.
3,924,849.—PAPER GRIPPING DEVICE FOR USE WITH A CHAIN DRIVEN PAPER CARRIAGE. DEC. 9, 1975.

Class 6H

3,704,881.—TRANSFER SHEET PEELING DEVICE FOR XEROGRAPHIC APPARATUS. DEC. 5, 1972. CAN. 940546, U.K. 1275888.

Class 7C

3,764,207.—ELECTROPHOTOGRAPHIC PROCESS UTILIZING SINGLE CHARGING MEANS FOR EFFECTING SIMULTANEOUS FUNCTIONS OF CHARGING AND FACILITATING TONER IMAGE TRANSFER. OCT. 9, 1973.

Class 7E1

3,716,360.—MOLTEN IMAGE TRANSFER IN ELECTROPHOTOGRAPHY. FEB. 13, 1973. BEL. 763191, FRA. 7105717, GER. 2108080, ITL. 919905, U.K. 1313059.

Class 7E3A

3,549,359.—COLOR ELECTROPHOTOGRAPHY EMPLOYING DYE TRANSFER FROM A DYE-CONTAINING PHOTOSENSITIVE LAYER TO AN IMAGE RECEIVING SHEET. DEC. 22, 1970. FRA. 1524473, GER. 1,572,341, JAP. 45-40159, U.K. 1,183,532.
3,654,865.—METHOD FOR FORMING DYE IMAGE USING AN ELECTROPHOTOGRAPHIC DEVELOPER CONTAINING A GELATIN TONER. APR. 11, 1972. AUS. 435812, BEL. 745534, CAN. 924.951, FRA. 7004034, ITL. 888.447, JAP. 48-9017, U.K. 1257296.

Class 8A

3,825,407.—HEATER HOLDING BRACKET FOR A HEAT FIXER IN A COPYING MACHINE OR THE LIKE. JULY 23, 1974.

Class 8AB

3,806,314.—FIXING APPARATUS FOR THERMOPLASTIC RECORDING. APR. 23, 1974.

Class 8A1B

3,818,185.—HEAT FUSION-BONDING APPARATUS FOR ELECTROPHOTOGRAPHY. JUNE 18, 1974.
3,916,256.—PROTECTIVE CIRCUIT IN A TEMPERATURE REGULATOR FOR THE THERMAL FIXING DEVICE OF A DUPLICATOR. NOV. 4, 1975.

Class 8A2

3,904,786.—PROCESS FOR FIXING IMAGES BY CONTACT HEATING IN A DUPLICATOR. SEPT. 9, 1975.
3,981,269.—FIXING DEVICE FOR ELECTROPHOTOGRAPHIC DUPLICATING MACHINES. SEPT. 21, 1976. GER. P2507365.8, JAP. 31159, KOR. 3389, U.K. 5395-75.

Class 8A2A

3,788,930.—METHOD OF FIXING IMAGES OBTAINED BY LIQUID DEVELOPMENT IN ELECTROPHOTOGRAPHY. JAN. 29, 1974. BEL. 774763.

Class 8B

3,647,773.—SUSPENSION POLYMERIZATION IN THE PRESENCE OF A METHYL STYRENE. MAR. 7, 1972. BEL. 727179, FRA. 2000527, JAP. 47-909, U.K. 1251434.

Class 8C

3,385,699.—PROCESS FOR PROCESSING ELECTROPHOTOSENSITIVE LAYERS. MAY 28, 1968. BEL. 651039, FRA. 1402385, HOL. 130806, SWD. 310458, U.K. 1072476.
3,740,249.—SOLVENT FIXING PROCESS. JUNE 19, 1973. JAP. 49-26591.

Class 9A

3,488,896.—PROCESS OF PUMICING A SURFACE. JAN. 13, 1970. FRA. 1,474,687, ITL. 782,665, JAP. 44-12197, U.K. 1,143,923.
3,936,183.—ELECTROPHOTOGRAPHIC COPYING MACHINE WITH IMPROVED CLEANING BLADE. FEB. 3, 1976.

Class 9A1

3,766,592.—DRUM CLEANING DEVICE FOR AN ELECTROPHOTOGRAPHIC DUPLICATOR. OCT. 23, 1973.

Class 9B3

3,671,290.—IMAGING SYSTEM. JUNE 20, 1972. CAN. 917486, JAP. 48-8134, U.K. 1278858.
3,703,400.—DEVELOPING METHOD FOR ELECTROPHOTOGRAPHY. NOV. 21, 1972. AUS. 435816, BEL. 748.590, CAN. 898073, FRA. 7012445, GER. 2016586, ITL. 903950, U.K. 1251623.

Class 10A, 10E

3,922,662.—DETECTOR FOR USE WITH A DUPLICATOR OR THE LIKE FOR DETECTING INCORRECTLY ALIGNED DOCUMENTS. NOV. 25, 1975.

Class 14A5

3,937,883.—BRAKING CIRCUIT FOR USE WITH PHASE SYNCHRONIZING CIRCUITRY. FEB. 10, 1976.

Class 15

3,795,187.—IMPELLERS FOR IMPACT PRINTERS. MAR. 5, 1974.

Class 17B1

3,687,538.—APPARATUS FOR EXPOSING LATENT IMAGE MARGINS IN ELECTROPHOTOGRAPHIC COPYING APPARATUS. AUG. 29, 1972. CAN. 931204, U.K. 1350795.

Class 17D3

3,936,664.—METHOD AND APPARATUS FOR GENERATING CHARACTER PATTERNS. FEB. 3, 1976.

Class 18A

3,417,733.—APPARATUS FOR VACUUM COATING. DEC. 24, 1968. FRA. 1,415,251, GER. 1,521,238. JAP. 40-26402, U.K. 1,081,324.
3,730,711.—PHOTOCONDUCTIVE MATERIAL FOR ELECTROPHOTOGRAPHY. MAY 1, 1973. BEL. 754699, CAN. 925087, FRA. 754699, GER. 2040152, JAP. 48-32381, U.K. 1272720.
3,799,340.—REFINING PHOTOCONDUCTIVE PARTICLE. MAR. 26, 1974. BEL. 776110, CAN. 944204, FRA. 714325.

Class 18A1

3,589,928.—PROCESS FOR THE PRODUCTION OF A LIGHT SENSITIVE MATERIAL FOR ELECTROPHOTOGRAPHY. JUNE 29, 1971. BEL. 685072, FRA. 1500187, GER. 1,522,603, JAP. 44-23775, U.K. 1139532.
3,607,363.—PROCESS FOR PRODUCING PHOTOCONDUCTIVE MATERIAL. SEPT. 21, 1971. U.K. 1210071.
3,625,747.—PHOTOCONDUCTIVE POWDERS AND A METHOD FOR PRODUCING THE SAME. DEC. 7, 1971.
3,634,333.—PROCESS FOR COATING ZINC OXIDE POWDER WITH CADMIUM SULFIDE. JAN. 11, 1972. BEL. 731056, CAN. 882.627, FRA. 2.005.849, GER. 1916761, JAP. 47-49616, U.K. 1215685.

3,682,825.—PROCESS FOR THE PRODUCTION OF ELECTROPHOTOGRAPHIC LIQUID DEVELOPER CONTAINING GELATIN. AUG. 8, 1972. AUS. 424258, BEL. 745390, CAN. 924165, FRA. 7003324, GER. 2004817, ITL. 887410, JAP. 48-7819, U.K. 1255762.

3,729,419.—LIQUID DEVELOPER. APR. 24, 1973. AUS. 451254, FRA. 71.09434, JAP. 48-43157, U.K. 1341627.

3,743,537.—METHOD OF MAKING ELECTROPHOTOGRAPHIC RECORDING MEMBER. JULY 3, 1973. AUS. 430736, ATR. 305766, BEL. 757.393, CAN. 928165, FRA. 7037234, ITL. 917004, JAP. 49-3846, U.K. 1269306.

3,755,177.—PROCESS OF MAKING LIQUID ELECTROSTATIC DEVELOPERS CONTAINING GELATIN. AUG. 28, 1973. AUS. 443292, CAN. 925743, JAP. 48-7820, U.K. 1284646.

3,803,011.—PROCESS FOR PREPARING 2, 3-DIHYDRO-1H,6H-1,5-BENZODIAZOCINE-2-ONE DERIVATIVE. APR. 9, 1974.

Class 18A2

3,761,261.—PHTHALOCYANINE DYE SENSITIZERS FOR ZINC OXIDE. SEPT. 25, 1973.

Class 18AB

3,806,314.—FIXING APPARATUS FOR THERMOPLASTIC RECORDING. APR. 23, 1974.

Class 18A3

3,661,572.—MANUFACTURING PROCESS FOR MANUFACTURING ELECTROPHOTOGRAPHIC SENSITIVE MATERIAL. MAY 9, 1972. AUS. 429948, BEL. 754323, CAN. 754323, FRA. 7028557, GER. 2038762, ITL. 902691, U.K. 1305298.

Class 18B

3,548,035.—SUSPENSION POLYMERIZATION PROCESS. DEC. 15, 1970. FRA. 1559138, GER. 1720782, JAP. 45-40052, U.K. 1185775.

3,625,747.—PHOTOCONDUCTIVE POWDERS AND A METHOD FOR PRODUCING THE SAME. DEC. 7, 1971.

3,647,773.—SUSPENSION POLYMERIZATION IN THE PRESENCE OF METHYL STYRENE. MAR. 7, 1972. BEL. 727179, FRA. 2000527, JAP. 47-909, U.K. 1251434.

3,668,126.—METHOD OF PRODUCING ELECTROPHOTOGRAPHIC LIQUID DEVELOPERS HAVING VERY FINE COLORING MATERIAL. JUNE 6, 1972. BEL. 709625, FRA. 1562934, U.K. 1218064.

3,697,266.—ORGANIC PHOTOCONDUCTIVE MATERIALS FOR ELECTROPHOTOGRAPHY. OCT. 10, 1972. BEL. 761043, CAN. 915493, FRA. 2074451, ITL. 913992, JAP. 48-38429, U.K. 1323109.

3,716,505.—PROCESS FOR SUSPENSION POLYMERIZATION. FEB. 13, 1973. FRA. 2048682, GER. 2025104, JAP. 47-23406, U.K. 1316693.

Class 18C

3,622,515.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPER HAVING A PROTEOLYTIC ENZYME. NOV. 23, 1971. AUS. 436813, BEL. 732273, CAN. 896948, FRA. 2007.520, ITL. 867188, JAP. 47-17879, U.K. 1231544.

3,718,593.—PROCESS FOR THE PRODUCTION OF AN ELECTROPHOTOGRAPHIC LIQUID DEVELOPER CONTAINING GELATIN. FEB. 27, 1973. AUS. 438586, BEL. 745535, CAN. 924166, FRA. 7004034, ITL. 888743, JAP. 48-7822, U.K. 1255763.

3,740,249.—SOLVENT FIXING PROCESS. JUNE 19, 1973. JAP. 49-26591.

Class 18C2A1

3,704,119.—ELECTROPHOTOGRAPHIC PROCESS USING TONER OF SAME REFRACTIVE INDEX AS ORGANIC PHOTOCONDUCTIVE LAYER. NOV. 28, 1972. AUS. 433360, BEL. 754544, FRA. 7028556, ITL. 902771, JAP. 48-21054, U.K. 1321065.

Class 18C2A2

3,668,126.—METHOD OF PRODUCING ELECTROPHOTOGRAPHIC LIQUID DEVELOPERS HAVING VERY FINE COLORING MATERIAL. JUNE 6, 1972. BEL. 709625, FRA. 1562934, U.K. 1218064.

3,682,825.—PROCESS FOR THE PRODUCTION OF ELECTROPHOTOGRAPHIC LIQUID DEVELOPER CONTAINING GELATIN. AUG. 8, 1972. AUS. 424258, BEL. 745390, CAN. 924165, FRA. 7003324, GER. 2004817, ITL. 887410, JAP. 48-7819, U.K. 1255762.

Class 18C5A

3,597,368.—LIQUID DEVELOPER FOR ELECTROPHOTOGRAPHY CONTAINING YELLOW PIGMENT. AUG. 3, 1971. BEL. 719289, CAN. 846.122, FRA. 1578390, JAP. 46-10480, U.K. 1201134.

3,738,832.—COLOR ELECTROPHOTOGRAPHIC PROCESS EMPLOYING LIQUID DEVELOPER CONTAINING GELATIN. JUNE 12, 1973. CAN. 921746, JAP. 47-30858, U.K. 1277723.

Class 20A3

3,753,419.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPING APPARATUS. AUG. 21, 1973. AUS. 430722, BEL. 768788, CAN. 334540, FRA. 7122426, ITL. 928531, U.K. 1337485.

3,817,212.—ELECTROSTATOGRAPHIC LIQUID DEVELOPMENT APPARATUS. JUNE 18, 1974. U.K. 1310448.

Class 20B3

3,544,458.—METHOD OF FILTERING. DEC. 1, 1970. BEL. 732578, CAN. 888335.

Class 20C

3,707,139.—LIQUID TYPE ELECTROPHOTOGRAPHY DEVELOPING APPARATUS. DEC. 26, 1972. BEL. 756409, CAN. 918413, FRA. 7034577, GER. 1314865.

Class 20C2

3,753,466.—AUTOMATIC FIRE EXTINGUISHER IN ELECTROPHOTOGRAPHIC COPYING MACHINE OR THE LIKE. AUG. 21, 1973. U.K. 1334579.

Class 10C4

3,704,881.—TRANSFER SHEET PEELING DEVICE FOR XEROGRAPHIC APPARATUS. DEC. 5, 1972. CAN. 940546, U.K. 1275888.

Class 20D

3,653,292.—AUTOMATIC CONTOUR TRACING DEVICE. APR. 4, 1972. FRA. 7204547, GER. 2033094, U.K. 1295128.

3,825,407.—HEATER HOLDING BRACKET FOR A HEAT FIXER IN A COPYING MACHINE OR THE LIKE. JULY 23, 1974.

Class 20D1

3,791,643.—CHAIN DELIVERY PAPER FEEDING DEVICE. FEB. 12, 1974. JAP. 48-20232.

Class 20G

3,795,187.—IMPELLERS FOR IMPACT PRINTERS. MAR. 5, 1974.

Class 20I

3,341,664.—METAL DRAWING APPARATUS. APR. 24, 1974.

Class 25A4

3,952,167.—ELECTROMAGNETIC COUPLER FOR USE WITH A TELEPHONE SET. APR. 20, 1976.

Class 25C2

3,341,631.—CIRCUIT INTERRUPTER. APR. 24, 1974. BEL. 764267, CAN. 932954, FRA. 7109086.

3,846,647.—TRIGGER CIRCUIT FOR USE WITH MULTIVIBRATORS. NOV. 5, 1974.

Class 25C4

3,838,344.—FREQUENCY MULTIPLYING CIRCUIT. SEPT. 24, 1974.

Class 25C5

3,936,675.—REFERENCE POINT POTENTIAL COMPENSATING CIRCUIT FOR USE WITH PHASE CONTROLLER. FEB. 3, 1976.

Class 27D

3,779,206.—APPARATUS FOR SCRAPING LIQUID OFF OF SHEET MATERIAL. DEC. 18, 1973.

Class 32

3,813,262.—RESIN-IMPREGNATED TISSUE OVERLAYS. MAY 28, 1974. BEL. 777312, FRA. 7146406, ITL. 945655.

Class 32B

3,273,450.—DATA PROCESSING APPARATUS. NOV. 15, 1963. FRA. 1384061, GER. 1449563, GRB. 1048048, JAP. 629392.

Xerox Patents

Class 1A

2,573,881.—METHOD AND APPARATUS FOR DEVELOPING ELECTROSTATIC IMAGES WITH ELECTROSCOPIC POWDER. NOV. 6, 1951. AUS. 0149247, CAN. 0479868, GER. 0903414, GRB. 0693905, STZ. 0286142, SWD. 0171735.

3,877,936.—PHOTOCONDUCTIVE COPOLYMER OF N-VINYLCARBAZOLE AND N-VINYLPHTHALIMIDE. APR. 15, 1975. BEL. 0812436, FRA. 7409307, GRB. 1444048, ITL. 1010697, SPN. 0424411.

3,954,951.—PREPARATION OF RED AMORPHOUS SELENIUM. MAY 4, 1976.

3,961,954.—ACID SENSITIZED CHARGE TRANSFER COMPLEXES AND CYCLIC ELECTRSTATOGRAPHC IMAGNG METH-ACID SENSITIZATN. JUNE 8, 1976. CAN. 1002366.

4,009,249.—PREPARATION OF RED AMORPHOUS SELENIUM. FEB. 22, 1977.

Class 1A 1

3,607,261.—INORGANIC CRYSTALLINE BINDERS FOR ELECTROPHOTOGRAPHIC PLATES. SEPT. 21, 1971.

3,850,631.—PHOTOCONDUCTIVE ELEMENT WITH A POLYVINVLIDENE FLUORIDE BINDER. NOV. 26, 1974.

3,928,036.—FLEXIBLE XEROGRAPHIC PHOTORECEPTOR ELEMENT. DEC. 23, 1975.

3,981,728.—XEROGRAPHIC IMAGING MEMBER HAVING HEXAGONAL SELENIUM IN INTER-LOCKING CONTINUOUS PATHS. SEPT. 21, 1971.

Class 1A 1A

2,886,434.—PROTECTED PHOTOCONDUCTIVE ELEMENT AND METHOD OF MAKING SAME— HORIZONS. MAY 12, 1959. CAN. 0621931.

2,970,906.—XEROGRAPHIC PLATE AND A PROCESS OF COPY MAKING. FEB. 7, 1961. CAN. 0576158.

3,011,474.—XEROGRAPHIC DEVELOPMENT ELECTRODE APPARATUS. DEC. 5, 1961. CAN. 0701149, GRB. 0948138.

3,041,166.—XEROGRAPHIC PLATE AND METHOD. JUNE 26, 1962. CAN. 0617821, GRB. 0936649.

3,174,855.—METHOD FOR A PRODUCTION OF A XEROGRAPHIC PLATE. MAR. 23, 1965.

3,251,686.—XEROGRAPHIC PROCESS. MAY 17, 1966. FRA. 1292831, GER. 1243979, GRB. 0996972, JAP. 0416023.

3,312,547.—XEROGRAPHIC PLATE AND PROCESSES OF MAKING AND USING SAME. APR. 4, 1967.

3,341,326.—DARK DECAY CONTROLLED XEROGRAPHY. SEPT. 12, 1967. AUS. 0285843, CAN. 0729829, FRA. 1377592, GRB. 1029199, ITL. 0706101.

3,352,669.—PHOTOCONDUCTIVE MEMBER AND PROCESSES OF PREPARING AND USING SAME. NOV. 14, 1967. AUS. 0405164, CAN. 0834670, FRA. 1422625, GER. 1497194, GRB. 1052970, HOL. 0137891, ITL. 0749420, JAP. 0501912.

3,508,918.—XEROGRAPHIC PLATE CONTAINING ALUMINUM SELENIDE BARRIER LAYER. APR. 28, 1970. CAN. 0872175.

3,532,496.—XRGRPHC PLTS AND PROCS EMPLYNG HMGNUS DISPRSNS OF VTREOUS SLNIUM AND SNSTZNG DYES AS PHTCNDCTV LAYER. OCT. 6, 1970.

3,621,248.—METHOD USING XERORADIOGRAPHIC PLATE INSENSITIVE TO VISIBLE LIGHT. NOV. 16, 1971.

3,645,729.—METHOD OF TRANSFERRING ELECTROSTATIC LATENT IMAGES USING MULTIPLE PHOTOCONDUCTIVE LAYERS. FEB. 29, 1972.

3,690,252.—LITHOGRAPHIC INKING APPARATUS. SEPT. 12, 1972. CAN. 0919006.

3,930,853.—ACCELERATING AGING METHOD FOR SELENIUM ARSENIC PHOTOCONDUCTORS. JAN. 6, 1976.

4,013,463.—PHOTORECEPTOR FABRICATION UTILIZING AC ION PLATING. MAR. 22, 1977.

4,150,029.—SELENIUM AND SELENIUM ALLOY EVAPORATION TECHNIQUE. MAR. 29, 1977.

4,016,310.—COATR HRDWR AND METH FOR OBTNG UNFRM PHROCNDTV LAYR ON A XEROGRAPHIC PHOTORECEPTOR. APR. 5, 1977.

4,109,902.—PHOTORECEPTOR FABRICATION. APR. 26, 1977.

4,023,523.—COATING HARDWARE AND METHOD FOR OBTAINING UNIFORM PHOTOCONDUCTIVE LAYERS ON A XEROGRAPHIC PHOTO. MAY 17, 1977.

Class 1A 1B

2,745,327.—ELECTROPHOTOGRAPHIC PROCESS. MAY 15, 1956.

2,803,542.—XEROGRAPHIC PLATE. AUG. 20, 1957. CAN. 0603581, FRA. 1181499, GRB. 0876569.

2,863,768.—XEROGRAPHIC PLATE. DEC. 9, 1958.

3,312,548.—XEROGRAPHIC PLATES. APR. 4, 1967. BEL. 0691217, CAN. 0819658, FRA. 1505803, GRB. 1165579, JAP. 0650232.

3,355,289.—CYCLICAL XEROGRAPHIC PROCESSD UTILIZING A SELENIUM-TELLURIUM XEROGRAPHIC PLATE. NOV. 28, 1967.

3,427,157.—XEROGRAPHIC PROCESS UTILIZING A PHOTOCONDUCTIVE ALLOY OF THALLIUM IN SELNIUM. FEB. 11, 1969. CAN. 0834085, FRA. 1461161, GRB. 1132993, HOL. 0150924, ITL. 0749553, JAP. 0534762, MEX. 0085232.

3,489,560.—PHOTOCONDUCTIVE LAYR COMPRISN SELENIUM COMPOUND AND SOLID HYDROPHOBIC METL SALT OF A FATTY ACID. JAN. 13, 1970. BEL. 0711297, CAN. 0871632, FRA. 1544448, GRB. 1203237, ITL. 0815227, JAP. 0632160.

3,490,903.—ALLOYS OF ANTIMONY AND SELENIUM USED IN PHOTOCONDUCTIVE ELEMENTS. JAN. 20, 1970. AUS. 0412949, CAN. 0871074, FRA. 1533536, GRB. 1185389, ITL. 0805955, JAP. 0626127, SWD. 0318193.

3,511,649.—PROCESS OF REDUCING FATIGUE IN PHOTOCONDUCTIVE GLASSES. MAY 12, 1970. GRB. 1193472, JAP. 0604152.

3,524,745.—PHOTOCONDUCTIVE ALLOY OF ARSENIC ANTIMONY AND SELENIUM. AUG. 18, 1970. ARG. 0164055, AUS. 0410443, BEL. 0709132, CAN. 0884810, CHL. 0024255, FRA. 1550902, GRB. 1209971, IND. 0113988, ITL. 0833508, JAP. 9124370, LXB. 0055231, MEX. 0108993, NOR. 0127943, NZL. 0151243, PRU. 0009904, PTG. 0048919, SAF. 0680228, SPN. 0349235, STZ. 0495573, SWD. 0328189, URG. 0009683.

3,645,729.—METHOD OF TRANSFERRING ELECTROSTATIC LATENT IMAGES USING MULTIPLE PHOTOCONDUCTIVE LAYERS. FEB. 29, 1972.

3,690,252.—LITHOGRAPHIC INKING APPARATUS. SEPT. 12, 1972. CAN. 0919006.

3,709,683.—INFRARED SENSITIVE IMAGE RETENTION PHOTORECEPTOR. JAN. 9, 1973.

3,874,917.—METHOD OF FORMING VITREOUS SEMICONDUCTORS BY VAPOR DEPOSITING BISMUTH AND SELENIUM. APR. 1, 1975.

4,015,029.—SELENIUM AND SELENIUM ALLOY EVAPORATION TECHNIQUE. MAR. 29, 1977.

4,016,310.—COATR HRDWR AND METH FOR OBTNG UNFRM PHROCNDTV LAYR ON A XEROGRAPHIC PHOTORECEPTOR. APR. 5, 1977.

4,019,902.—PHOTORECEPTOR FABRICATION. APR. 26, 1977.

4,023,523.—COATING HARDWARE AND METHOD FOR OBTAINING UNIFORM PHOTOCONDUCTIVE LAYERS ON A XEROGRAPHIC PHOTO. MAY 17, 1977.

Class 1A 1C

2,937,944.—XEROGRAPHIC LIGHT-SENSITIVE MEMBER AND PROCESS THEREFOR. MAY 24, 1960. AUS. 0242066, BEL. 0586070, CAN. 0610194, FRA. 1243723, GER. 1165408, GRB. 0894371, ITL. 0620746, JAP. 0318674, STZ. 0394806.

3,008,825.—XEROGRAPHIC LIGHT-SENSITIVE MEMBER AND PROCESS THEREFOR. NOV. 14, 1961. CAN. 0610195.

3,077,398.—XEROGRAPHIC PLATE MADE BY CAST COATING. FEB. 12, 1963.

3,080,251.—METHOD OF XEROGRAPHIC DEVELOPMENT. MAR. 5, 1963.

3,121,006.—PHOTO-ACTIVE MEMBER FOR XEROGRAPHY. FEB. 11, 1964. ARG. 0147758, BEL. 0656892, CAN. 0674311, CHL. 0020455, CLB. 0014118, ECD. 0000029, GUA. 0001696, PRU. 0009656, TRK. 0012835, URG. 0006526, VZL. 0016353.

3,121,007.—PHOTO-ACTIVE MEMBER FOR XEROGRAPHY. FEB. 11, 1964.

3,140,174.—PROCESS FOR OVERCOATING A XEROGRAPHIC PLATE. JULY 7, 1964. GRB. 0960871.

3,151,982.—XEROGRAPHIC PLATE. OCT. 6, 1964. ARG. 0149584, ATR. 0247148, AUS. 0275834, BEL. 0630478, BRA. 0088013, CAN. 0879017, DNK. 0116787, FRA. 1359402, GER. 1497054, GRB. 1049872, GRK. 0026268, HOL. 0139212, IND. 0086999, ISR. 0018877, ITL. 0701505, JAP. 0489512, LXB. 0043461, MEX. 0081663, NOR. 0108058, NZL. 0134420, PTG. 0040700, SAF. 0001331, SPN. 0286492, STZ. 0450173, SWD. 0313998.

3,251,686.—XEROGRAPHIC PROCESS. MAY 17, 1966. FRA. 1292831, GER. 1243979, GRB. 0996972, JAP. 0416023.

3,379,527.—PHOTOCONDUCTIVE INSULATORS COMPRISING ACTIVATED SULFIDES SELENIDES AND SULFOSELENIDES OF CADMIUM. APR. 23, 1968. CAN. 0907921, GRB. 1079065.

3,519,420.—METHOD OF CHARGING A ZINC OXIDE PHOTOCONDUCTIVE LAYER WITH A POSITIVE CHARGE. JULY 7, 1970.

3,522,040.—PHOTOSENSITIVE INSULATING MATERIAL. JULY 28, 1970. CAN. 0884808, GRB. 1171910, JAP. 0552966.

3,941,594.—ELECTROPHOTOGRAPHIC ELEMENT WITH ZNO AND TIO2. MAR. 2, 1976.

3,969,113.—PHOTOSENSITIVE BINDER LAYER FOR XEROGRAPHY CONTAINING TITANIUM OXIDE AND A CADMIUM PIGMENT. JULY 13, 1976.

3,975,306.—METHOD FOR IMPROVING THE PHOTOINDUCED DISCHARGE CHARACTERISTICS OF CERTAIN CADMIUM CHALOCOGENIDE. AUG. 17, 1976.

Class 1A 1E

3,469,978.—PHOTOSENSITIVE ELEMENT. SEPT. 30, 1969. CAN. 0872173, GRB. 1171909, JAP. 0552967.

Class 1A 1F

3,288,604.—IMAGING METHOD USING AN ELEMENT HAVING A GLASS OVERCOATING. NOV. 29, 1966. CAN. 0815735.

3,397,982.—XIC PLATE W/INORGANIC GLASS BINDER HAVING OVERCOATING CONSISTING ESSENTIALLY OF ALUMINUM OXIDE. AUG. 20, 1968. ARG. 0150690, AUS. 0407349, BEL. 0674140, CAN. 0866142, FRA. 1460232, GER. 1497230, GRB. 1129674, ITL. 0822914, JAP. 0531894, MEX. 0085270, SWD. 0319976.

3,507,646.—ELECTROPHOTOGRAPHIC PROCESS USING A SINGLE PHASE PHOTOCONDUCTIVE GLASS IMAGING LAYER. APR. 21, 1970. ARG. 0164449, AUS. 0416137, BEL. 0691757, CAN. 0818383, FRA. 1511172, GER. 1522713, GRB. 1167520, ITL. 0787661, JAP. 0567233, MEX. 0105237, SPN. 0334896, STZ. 0472707, SWD. 0331793, VZL. 0024006.

3,565,713.—METHOD OF FORMING A CERAMIC IMAGE ON A CERAMIC SUBSTRATE. FEB. 23, 1971.

Class 1A 2

3,738,831.—CHALCOGEN ORGANIC COMPOUNDS USED IN ELECTROPHOTOGRAPHIC PLATES AND PROCESS. JUNE 12, 1973.

3,758,301.—ELECTROPHOTOGRAPHIC USE OF SELENIUM CONTAINING POLYMERS. SEPT. 11, 1973.

3,770,428.—ORGANIC PHOTOCONDUCTIVE MATERIAL. NOV. 6, 1973.

3,850,631.—PHOTOCONDUCTIVE ELEMENT WITH A POLYVINVLIDENE FLUORIDE BINDER. NOV. 26, 1974.

3,864,144.—PROCESS FOR PREPARATION OF PHOTOCONDUCTIVE FILMS FROM INTRACTABLE MATERIALS. FEB. 4, 1975. FRA. 740836, GRB. 1414158, ITL. 1010695, TIW. 0008534.

3,879,198.—ELECTROPHOTOGRAPHIC AMBIPOLAR PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHOD. APR. 22, 1975.

3,882,087.—ORGANIC PHOTOCONDUCTIVE MATERIAL. MAY 6, 1975.

3,903,107.—DIRECT ALPHA TO X PHASE CONVERSION OF METAL CONTAINING PHTHALOCYANINE. SEPT. 2, 1975. BEL. 0815632, SAF. 0743536.

3,915,704.—PHOTOINDUCED ACID CATALYZED DEGRADATION OF DEGRADABLE POLYMERS. OCT. 28, 1975.

3,917,483.—PHOTOINDUCED ACID CATALIZED DEPOLYMERIZATION OF DEGRADABLE POLYMERS. NOV. 4, 1975.

3,923,762.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND P. DEC. 2, 1975. BEL. 0822305, STZ. 0032598.

3,932,180.—DIRECT ALPHA TO X PHASE CONVERSION OF METAL-FREE PHTHALOCYANINE. JAN. 13, 1976. BEL. 0815632, SAF. 0743536.

3,943,108.—PHOTOCONDUCTIVE COMPOSITION OF AN ALDEHYDE CONDENSATE. MAR. 9, 1976.

3,951,658.—COLOR MODIFYING IMAGING METHOD AND ARTICLE. APR. 20, 1976.

3,954,906.—AMBIPOLAR PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHOD. MAY 4, 1976. FRA. 7403086, GRB. 1446966.

3,978,029.—PHOTOCONDUCTIVE COMPOSITIONS AND IMAGING MEMBERS AND METHODS EMPLOYING SAME. AUG. 31, 1976. ARG. 0206212, BEL. 0816552, FRA. 7422479, SAF. 0744129.

3,981,848.—PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHODS EMPLOYING SAME. SEPT. 21, 1976. ARG. 0206211, ATR. 0332734, FRA. 7422484.

Class 1A 2A

3,081165.—XEROGRAPHIC CHEMOGRAPHY. MAR. 12, 1963. CAN. 0618594, GRB. 0977904.

3,357,989.—METAL FREE PHTHALOCYANINE IN THE NEW X-FORM-SEE D2167 FOR RE27117. DEC. 12, 1967. CAN. 0860929, FRA. 1508173, GRB. 1169901, ITL. 0787592, JAP. 0560090, MEX. 0101543.

3,432,415.—ELECTROPHORETIC IMG. PROCESS USING PHOTOSENSITIVE XANTHENONIUM SALTS. MAR. 11, 1969. AUS. 0439502, BEL. 0743895, CAN. 0851118, GER. 1522701, GRB. 1155747, JAP. 0650631, MEX. 0104632.

3,442,781.—PHOTOELECTROPHORETIC AND XEROGRAPHIC IMG. PROC. EMPL. TRIPHENODIOXAZINES AS ELECTRIC. PHOTOSENSIT. MAY 6, 1969. AUS. 0445582, BEL. 0743894, CAN. 0855152, GRB. 0175452, JAP. 0611634.

3,445,225.—ELECTROPHOTOGRAPHIC IMAGING PROCESS. MAY 20, 1969. CAN. 0846121.

3,445,227.—ELECTROPHOTOGRAPHIC IMAGING PROCESSES EMPLOYING 2,4 DIAMINOTRIAZINES AS ELCTRCLY PHOTOSNSTV PRT. MAY 20, 1969. BEL. 0743891, CAN. 0852681, GER. 1522687, GRB. 1146019, JAP. 0617789.

3,448,028.—N-SBSTUD-8,13-DIOXODINAPHTHO-2-1-B,2,3-D-FURAN-6-CARBOXAMIDES AS ELCTLY PTOSNSTV MTLS IN ELCPHG. JUNE 3, 1969.

3,448,029.—ELECTROPHORETIC IMAGING PROCESS USING 8,13-DIOXODINAPTHO-2,1-B,2,3-D-FURAN-6-CARBOXAMIDE PIGMEN. JUNE 3, 1969.

3,448,030.—ELECTRICALLY PHOTOSENSITIVE PART. USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROCESSE. JUNE 3, 1969. AUS. 0445639, BEL. 0743893, CAN. 0943830, GRB. 1155554, JAP. 0686735.

3,482,970.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS USING NAPHTHYLAZO COMPOUNDS AS THE PRIMARY PHOTOCONDUCTOR. DEC. 9, 1969. ATR. 0279351, AUS. 0453397, BEL. 0742978, CAN. 0869486, GRB. 1296390, ITL. 0878843, JAP. 0725059.

3,607,261.—INORGANIC CRYSTALLINE BINDERS FOR ELECTROPHOTOGRAPHIC PLATES. SEPT. 21, 1971.

3,615,409.—ELCTROPHOTOGRPHC PLATE AND PROCESS EMPLOYING A PHOTODNDCTV PIGMNT OF GENERAL FORMULA R2 N4 S3. OCT. 26, 1971.

3,640,710.—PHTHALOCYANINE PHOTOCONDUCTIVE ELEMENTS CONTAINING MULTIPLE BINDER MATERIALS. FEB. 8, 1972. ARG. 0184666, ATR. 0328861, AUS. 0456430, BEL. 0760751, CAN. 0933012, FRA. 7047636, GRB. 1333605, ITL. 0913999, PNM. 0002243, STZ. 0554550, SWD. 0365878, TIW. 0006738, USR. 0450420, VZL. 0032928.

3,672,979.—METHOD OF PRODUCING A PHTHALOCYANINE PHOTOCONDUCTIVE LAYER. JUNE 27, 1972. ARG. 0184673, AUS. 0457271, BEL. 0761135, CAN. 0951697, FRA. 7047702, GRB. 1334060, ITL. 0914074, JAP. 0753795, MEX. 0119529, PNM. 0002191, SPN. 0386759, STZ. 0571731, TIW. 0007180, VZL. 0032789.

3,708,292.—PI-FORM METAL PHTHALOCYANINE. JAN. 2, 1973. ARG. 0194234, BEL. 0783793, CAN. 0996931, GRB. 1396922, ITL. 0955644, MEX. 0128928.

3,789,216.—PHOTODETECTION DEVICE AND METHOD COMPRISING PHTHALOCYANINE. JAN. 29, 1974.

3,865,798.—PHOTOACTIVE POLYMERS INDUCED EXOCYCLIC QUARTET CONCEPT. FEB. 11, 1975. AUS. 0462805, BEL. 0790689, FRA. 7237458, GRB. 1411998, ITL. 0969902, MEX. 0133728, SPN. 0407984, STZ. 0028515, VZL. 003956.

3,895,945.—PROCESS FOR PREPARATION OF A DYESTUFF SENSITIZED PHOTOCONDUCTIVE COMPOSITION. JULY 22, 1975.

3,923,762.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND P. DEC. 2, 1975. BEL. 0822305, STZ. 0032598.

3,951,654.—MTHD ENHNCMT RATE AND EFFICIENCY OF PHOTODSCHG OF ELCTRPHGRIC IMAGING MEMBERS COMPRSNG PHTHALOCYA. APR. 20, 1976.

3,970,602.—COPOLYMERS OF N-VINYLCARBAZOLE AND N-VINYLPHTHALIMIDE AND DERIVATIVES THEREOF. JULY 20, 1976. BEL. 0812436. FRA. 7409307, GRB. 1444048, ITL. 1010697, SPN. 0424411.

3,989,860.—REPAIR TECHNIQUE FOR PHOTORECEPTOR. NOV. 2, 1976.

4,006,017.—PHOTOCONDUCTIVE COMPOSITION ARTICLE AND PROCESS. FEB. 1, 1977.

4,012,122.—LIQUID CRYSTALLINE PLATEN FOR A ELECTROPHOTOGRAPHIC PRINTING MACHINE. MAR. 15, 1977.

Class 1A 2B

3,408,182.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMP. OCT. 29, 1968. CAN. 0847805, FRA. 1463743, GER. 1522679, GRB. 1137665, ITL. 0755290, JAP. 0572185, MEX. 0107318.

3,408,183.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMP. OCT. 29, 1968. CAN. 0819066, FRA. 1463745, GER. 1522676, GRB. 1126048, ITL. 0755287, JAP. 0727091, MEX. 0106758.

3,408,184.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRNSFR COMPLE. OCT. 29, 1968. CAN. 0818382, FRA. 1463727, GRB. 1137664, ITL. 0755289, JAP. 0726382, MEX. 0105835.

3,408,185.—ELECTROPHOTOGRAPHIC MATERIALS AND METHOD EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMP. OCT. 29, 1968. CAN. 0848383, FRA. 1463728, GER. 1645192, GRB. 1137476, ITL. 0755291, MEX. 0106763.

3,408,186.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRNSFR COMPLE. OCT.29,1968. CAN. 0846736, FRA. 1463746, GRB. 1138629, ITL. 0755288, JAP. 0569483, MEX. 0106589.

3,408,187.—ELECTROPHOTOGRAPHIC MATER AND METH EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMPLEXES. OCT. 29, 1968. CAN. 0867298, GER. 1522721, GRB. 1163097, JAP. 0797719.

3,408,188.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS COMPRISING PHOTOCONDUCTIVE CHARGE TRANSFER COMPLEXES. OCT. 29, 1968. CAN. 0869485, GRB. 1183516, JAP. 0797720.

3,408,189.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS EMPLOYING PHOTOCONDUCTIVE CHARGE TRANSFER COMPLEXES. OCT. 29, 1968.

3,408,190.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS EMPLOYING PHOTOCONDUCTIVE CHARGE TRANSFER COMPLEXES. OCT. 29, 1968. CAN. 0850019, GER. 1302772, GRB. 1182172.

3,536,482.—ELECTROPHOTOGRPHC IMG SYS INCL A HALOGEN TREATMENT STOP FOR MAKING BCKGRND AREAS TRANSPARENT. OCT. 27, 1970.

3,607,258.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS. SEPT. 21, 1971. CAN. 0871634, GRB. 1174171.

3,865,798.—PHOTOACTIVE POLYMERS INDUCED EXOCYCLIC QUARTET CONCEPT. FEB. 11, 1975. AUS. 0462805, BEL. 0790689, FRA. 7237458, GRB. 1411998, ITL. 0969902, MEX. 0133728, SPN. 0407984, STZ. 0028515, VZL. 0033956.

3,879,201.—PERSISTENT PHOTOCONDUCTIVE COMPOSITIONS. APR. 22, 1975.

3,899,328.—ACTIVE MATRIX AND INTRINSIC PHOTOCONDUCTIVE POLYMER OF A LINEAR POLYSILOXANE. AUG. 12, 1975.

3,923,762.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND P. DEC. 2, 1975. BEL. 0822305, STZ. 0032598.

3,957,725.—AN ACTIVE MATRIX AND INTRINSIC PHOTOCONDUCTIVE POLYMER. MAY 18, 1976. ITL. 1010430.

4,007,043.—PHOTOCONDUCTIVE ELEMENTS WITH COPOLYMER CHARGE TRANSPORT LAYERS. FEB. 8, 1977.

4,013,623.—INTRACHAIN CHARGE TRANSFER COMPLEXES. MAR. 22, 1977.

4,025,710.—INTRACHAIN CHARGE TRANSFER COMPLEXES. MAY 24, 1977.

4,033,769.—PERSISTENT PHOTOCONDUCTIVE COMPOSITIONS. JULY 5, 1977.

Class 1A 2C

3,451,811.—ELECTROPHOTOGRAPHIC IMAGING PROCESSES USING ELECTRICALLY PHOTOSENSITIVE PHOTOCHROMIC MATERIALS. JUNE 24, 1969. CAN. 0828692, JAP. 0573734.

3,660,086.—ELCTRPHTGRPC PLATE AND PROCS EMPLYNG INORGNC PHOTCNDCTV MATRL W/PHOTOCHROMIC SENSITIVE AGENT. MAY 2, 1972.

3,961,948.—PHOTOCHROMIC IMAGING METHOD. JUNE 8, 1976.

Class 1A 2D

3,518,081.—IMAGE FORMATION AND DEVELOPMENT - REISSUED D 857R. JUNE 30, 1970. CAN. 0801270, GRB. 1085573.

Class 1A 3

3,041,166.—XEROGRAPHIC PLATE AND METHOD. JUNE 26, 1962. CAN. 0617821, GRB. 0936649.

3,312,547.—XEROGRAPHIC PLATE AND PROCESSES OF MAKING AND USING SAME. APR. 4, 1967.

3,341,326.—DARK DECAY CONTROLLED XEROGRAPHY. SEPT. 12, 1967. AUS. 0285843, CAN. 0729829, FRA. 1377592, GRB. 1029199, ITL. 0706101.

3,352,669.—PHOTOCONDUCTIVE MEMBER AND PROCESSES OF PREPARING AND USING SAME. NOV. 14, 1967. AUS. 0405164, CAN. 0834670, FRA. 1422625, GER. 1497194, GRB. 1052970, HOL. 0137891, ITL. 0749420, JAP. 0501912.

3,393,070.—XEROGRAPHIC PLATE WITH ELECTRIC FIELD REGULATING LAYER. JULY 16, 1968. CAN. 0871308, GER. 1490987, GRB. 1141452, JAP. 0764435, MEX. 0105660.

3,508,918.—XEROGRAPHIC PLATE CONTAINING ALUMINUM SELENIDE BARRIER LAYER. APR. 28, 1970. CAN. 0872175.

3,573,906.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS. APR. 6, 1971. ARG. 0177890, AUS. 0441534, BEL. 0725173, BRA. 0088092, CAN. 0906801, CZC. 0157053, FRA. 1594981, GRB. 1217726, ITL. 0852743, SPN. 0379204, SWD. 0335063, USR. 0448658, VZL. 0029780.

3,723,110.—ELECTROPHOTOGRAPHIC PROCESS. MAR. 27, 1973.

3,765,757.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. OCT. 16, 1973. BEL. 0793551, CAN. 1004289, GRB. 1419978, ITL. 0972846, SPN. 0410107.

3,867,027.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. FEB. 18, 1975. BEL. 0793551, CAN. 1004289, GRB. 1419978, ITL. 0972846, SPN. 0410107.

3,907,650.—PHOTOSENSITIVE BINDER LAYER FOR XEROGRAPHY. SEPT. 23, 1975.

3,914,126.—NICKEL OXIDE INTERLAYERS FOR PHOTOCONDUCTIVE ELEMENTS. OCT. 21, 1975.

Class 1A 4

2,886,434.—PROTECTED PHOTOCONDUCTIVE ELEMENT AND METHOD OF MAKING SAME - HORIZONS. MAY 12, 1959. CAN. 0621931.

3,251,686.—XEROGRAPHIC PROCESS. MAY 17, 1966. FRA. 1292831, GER. 1243979, GRB. 0996972, JAP. 0416023.

3,256,089.—MASKED PLATE XEROGRAPHY. JUNE 14, 1966.

3,288,604.—IMAGING METHOD USING AN ELEMENT HAVING A GLASS OVERCOATING. NOV. 29, 1966. CAN. 0815735.

3,397,982.—XIC PLATE W/INORGANIC GLASS BINDER HAVING OVERCOATING CONSISTING ESSENTIALLY OF ALUMINUM OXIDE. AUG. 20, 1968. ARG. 0150690, AUS. 0407349, BEL. 0674140, CAN. 0866142, FRA. 1460232, GER. 1497230, GRB. 1129674, ITL. 0822914, JAP. 0531894, MEX. 0085270, SWD. 0319976.

3,434,832.—XEROGRAPHIC PLATE COMPRISING A PROTECTIVE COATING OF A RESIN MIXED WITH A METALLIC STEARATE. MAR. 25, 1969. CAN. 0835883, FRA. 1454672, GER. 1497223, GRB. 1128156, ITL. 0772535, JAP. 0545757, MEX. 0085603.

3,488,189.—ELECTROPHOTOGRAPHIC RECORDING MEMBER HAVING SOLID CRYSTALLINE PLASTICIZR AVAILBL AT IMGNG SURFA. JAN. 6, 1970. CAN. 0866700, FRA. 1506810, GRB. 1183205, ITL. 0788976, JAP. 0570734, MEX. 0108241.

3,607,258.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS. SEPT. 21, 1971. CAN. 0871634, GRB. 1174171.

3,816,115.—METHOD FOR FORMING A PLURALITY OF ELECTROSTATIC LATENT IMAGES ON AN ELECTROPHOTOGRAPHIC PLATE. JUNE 11, 1974.

3,860,421.—N-ALKYL MORPHOLINE TREATMENT OF A SELENIUM-CONTAINING PHOTOCONDUCTIVE LAYER. JAN. 14, 1975.

3,865,798.—PHOTOACTIVE POLYMERS INDUCED EXOCYCLIC QUARTET CONCEPT. FEB. 11, 1975. AUS. 0462805, BEL. 0790689, FRA. 7237458, GRB. 1411998, ITL. 0969902, MEX. 0133728, SPN. 0407984, STZ. 0028515.

3,884,690.—POLYESTER PHOTOCONDUCTORS AND MATRIX MATERIALS. MAY 20, 1975.

3,896,184.—POLYMERS OF BENZANTHRACENE AS ACTIVE MATRIX MATERIALS. JULY 22, 1975.

3,899,328.—ACTIVE MATRIX AND INTRINSIC PHOTOCONDUCTIVE POLYMER OF A LINEAR POLYSILOXANE. AUG. 12, 1975.

3,957,725.—AN ACTIVE MATRIX AND INTRINSIC PHOTOCONDUCTIVE POLYMER. MAY 18, 1976. ITL. 1,010,430.

4,022,956.—POLYMERS OF BENZANTHRACENE AS ACTIVE MATRIX MATERIALS. MAY 10, 1977.

4,027,964.—IMAGING METHOD AND APPARATUS. JUNE 7, 1977. ARG. 0190535, BEL. 0777714, CAN. 0949825, FRA. 7201000, GRB. 1374501, ITL. 0946355, MEX. 0124981.

Class 1A 5

3,411,903.—XEROGRAPHIC METHOD AND PLATE COMPRISING PHOTOCONDUCTIVE INSULATING FIBERS. NOV. 19, 1968. ARG. 0149620, ATR. 0270379, AUS. 0410718, BEL. 0672668, BRA. 0084119, CAN. 0834669, CHL. 0023648, CLB. 0014943, DNK. 0120577, EGR. 0055545, FRA. 1464792, GER. 1497224, GRB. 1084024, GRK. 0031509, IND. 0102560, ISR. 0024632, ITL. 0734376, JAP. 0724233, LXB. 0049849, MEX. 0098487, NOR. 0122817, NZL. 0143432, PLO. 0067959, PLP. 0004547, PNM. 0001533, PRU. 0008384, PTG. 0044879, SAF. 0656280, SPN. 0319795, STZ. 0458076, SWD. 0308250, THL. 1084024, TIW. 0003735, URG. 0006624, VZL. 0023996.

3,947,184.—IMAGING METHOD. MAR. 30, 1976.

3,972,718.—ELECTROSTATOGRAPHIC GRAVURE MEMBER. AUG. 3, 1976.

Class 1A 6

3,003,869.—XEROGRAPHIC PLATE OF HIGH QUANTUM EFFICIENCY. OCT. 10, 1961.

3,288,602.—XEROGRAPHIC PLATE AND METHOD. NOV. 29, 1966. CAN. 0795978, GER. 1237902, GRB. 1029181, ITL. 0690835, JAP. 0578399.

3,621,248.—METHOD USING XERORADIOGRAPHIC PLATE INSENSITIVE TO VISIBLE LIGHT. NOV. 16, 1971.

3,684,500.—METHOD OF FORMING PERMANENT ELECTROSTATIC IMAGE WITH TWO-LAYERED PHOTORECEPTOR. AUG. 15, 1972.

3,843,407.—BLADE CLEANING WITH REVERSE MOVEMENT. OCT. 22, 1974.

3,907,650.—PHOTOSENSITIVE BINDER LAYER FOR XEROGRAPHY. SEPT. 23, 1975.

3,914,126.—NICKEL OXIDE INTERLAYERS FOR PHOTOCONDUCTIVE ELEMENTS. OCT. 21, 1975.

3,994,791.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. NOV. 30, 1976.

Class 1B

3,730,453.—EARLY END-OF-TAPE DETECTION. MAY 1, 1973. CAN. 0939052, GRB. 1354581.

3,889,292.—APPARATUS FOR MAKING MULTIPLE ALPHANURMIC COPIES OF A BINARY CODED MESSAGE. JUNE 10, 1975. CAN. 0986572.

4,032,746.—CONTROL SYSTEM FOR A FUSING APPARATUS. JUNE 28, 1977.

Class 1B 1

2,917,385.—REFLEX XEROGRAPHY. DEC. 15, 1959. CAN. 0577137.

3,244,546.—ELECTROSTATIC IMAGE REPRODUCTION. APR. 5, 1966. CAN. 0847532, GRB. 1040371, JAP. 0477223.

3,484,162.—ELECTROVISCOUS RECORDING. DEC. 16, 1969.

3,518,698.—IMAGING SYSTEM. JUNE 30, 1970. CAN. 0905481, FRA. 1542838, GRB. 1200804, JAP. 0604154, MEX. 0099911.

3,561,957.—ELECTROPHOTOGRAPHIC PROCESS USING A HIGH INTENSITY ELECTROMAGNETIC RADIATION SOURCE. FEB. 9, 1971. CAN. 0914266, GRB. 1207361.

3,631,507.—METHOD OF REDISTRIBUTING CHARGE ON A DIELECTRIC MEDIUM. DEC. 28, 1971.

3,677,750.—PHOTOELECTROSOLOGRAPHIC IMAGING. JULY 18, 1972. GRB. 1326934.

3,686,678.—DUAL MODE ELECTROSTATIC PRINTING. AUG. 22, 1972. BEL. 0747125, CAN. 0952574, FRA. 7007650, GRB. 1297996, JAP. 0753534.

3,693,185.—ELECTROSTATIC RECORDING HEAD AND METHOD OF MANUFACTURE. SEPT. 19, 1972.

3,719,481.—ELECTROSTATOGRAPHIC IMAGING PROCESS. MAR. 6, 1973.

3,729,123.—PRINTING MACHINE AND METHOD. APR. 24, 1973. CAN. 0959532, FRA. 7142517, GRB. 1348014.

3,729,334.—IMAGING PROCESS. APR. 24, 1973.

3,793,107.—ELECTROSTATIC RECORDING HEAD AND METHOD OF MANUFACTURE. FEB. 19, 1974.

3,829,185.—HOUSING ASSEMBLY FOR ELECTROSTATIC PRINTING MACHINE. AUG. 13, 1974.

3,854,942.—TRANSPARENCY FOR MULTI-COLOR ELECTROSTATIC COPYING. DEC. 17, 1974.

3,859,960.—PRINTING MACHINE WITH ELECTROSTATIC WEB DEVELOPING APPARATUS. JAN. 14, 1975. CAN. 0959532, FRA. 7142517, GRB. 1348014.

3,937,177.—ELECTROSTATIC PRINTING MACHINE WITH IMPROVED TONER FOUNTAIN AND RECOVERY, FEB. 10, 1976 .

3,985,666.—PLASTIC MATERIALS MIXED WITH POLAR GROUP CONTAINING MATERIALS. OCT. 12, 1976. ARG. 0195541, BEL. 0781970, CAN. 0976742, FRA. 7213873, GRB. 1396141, ITL. 0951326, MEX. 0126158, VZL. 0032937.

Class 1B 2

2,817,277.—ELECTROPHOTOGRAPHIC CAMERA. DEC. 24, 1957.

3,057,719.—PROCESS FOR FORMING ELECTROSTATIC IMAGES. OCT. 9, 1962. GRB. 0947039.

3,084,061.—METHOD FOR FORMATION OF ELECTROSTATIC IMAGE. APR. 2, 1963. CAN. 0607290.

3,196,013.—XEROGRAPHIC INDUCTION RECORDING WITH MECHANICALLY DEFORMABLE IMAGEFORMATION IN A DEFORMABLE LAY. JULY 20, 1965. CAN. 0778520, FRA. 1360084, GER. 1253581, ITL. 0711488, JAP. 0649672.

3,321,308.—XEROGRAPHIC INDUCTION RECORDING. MAY 23, 1967. CAN. 0778521, FRA. 1393821, GRB. 1049903, ITL. 0801906, JAP. 0537660.

3,551,146.—INDUCTION IMAGING SYSTEM. DEC. 29, 1970.

3,703,376.—INDUCTION SYSTEM. NOV. 21, 1972. ARG. 0190247, MEX. 0123032.

3,738,855.—INDUCTION IMAGING SYSTEM. JUNE 12, 1973.

3,778,841.—INDUCTION IMAGING SYSTEM. DEC. 11, 1973. ARG. 0190247, MEX. 0123032.

3,953,206.—IMAGING METHOD. APR. 27, 1976.

Class 1B 3

2,576,047.—METHOD AND APPARATUS FOR PRINTING ELECTRICALLY. NOV. 20, 1951. AUS. 0150449, CAN. 0485073, GER. 0919891, GRB. 0675398, STZ. 0286141, SWD. 0163889.

3,043,217.—ELECTROSTATIC PRINTING APPARATUS. JULY 10, 1962.

3,145,655.—EQUIPOTENTIAL XEROPRINTING MEMBER AND PROCESS OF PRINTING THERE WITH. AUG. 25, 1964. CAN. 0784647, GER. 1287095, GRB. 0958964, JAP. 0591209.

3,160,091.—HIGH SPEED XEROPRINTER AND METHOD THEREFOR. DEC. 8, 1964. GRB. 0978349.

3,318,698.—XEROPRINTING REPRODUCTION. MAY 9, 1967. CAN. 0790236, FRA. 1394421, GRB. 1055323, ITL. 0801547, JAP. 0504497.

3,515,584.—XEROPRINTING MASTER. JUNE 2, 1970. CAN. 0882600, GRB. 1204246, JAP. 0659019.
3,547,627.—LITHOGRPHC PRINTG MASTER AND METHOD EMPLOYING A CRYSTALLINE PHOTOCONDUCTIVE IMAGING LAYER. DEC. 15, 1970.
3,574,614.—PROCESS OF PREPARING MULTIPLE COPIES FROM A XEROPRINTING MASTER. APR. 13, 1971. ATR. 0305769, AUS. 0448396, BEL. 0743660, CAN. 0882599, FRA. 6944513, GRB. 1209060, ITL. 0879118, JAP. 0713808.
3,967,818.—DUPLICATING SYSTEM. JULY 6, 1976.

Class 1B 4A

2,825,814.—XEROGRAPHIC IMAGE FORMATION. MAR. 4, 1958. ARG. 0105238, AUS. 0203970, BRA. 0052412, CAN. 0564673, SAF. 0021814, SWD. 0200906.
2,937,943.—TRANSFER OF ELECTROSTATIC CHARGE PATTERN. MAY 24, 1960. CAN. 0680751.
2,982,647.—ELECTROSTATIC IMAGE REPRODUCTION. MAY 2, 1961.
3,015,304.—ELECTROSTATIC IMAGE REPRODUCTION. JAN. 2, 1962. CAN. 0713395.
3,653,891.—FORMS OVERLAY TECHNIQUE USING TESI. APR. 4, 1972. ARG. 0184314, AUS. 0459354, BEL. 0761030, CAN. 0946912, FRA. 7047635, GRB. 1339714, ITL. 0913996, MEX. 0119467.
4,023,895.—ELECTROSTATOGRAPHIC APPARATUS. MAY 17, 1977.

Class 1B 4B

2,919,967.—HIGH-SPEED ELECTROSTATIC ALPHANUMERICAL PRINTER. JAN. 5, 1960. CAN. 0682116, GER. 1199033, GRB. 0889663.
2,978,968.—RECORDING APPARATUS AND METHOD. APR. 11, 1961.
3,023,731.—ELECTROSTATIC ALPHANUMERICAL PRINTER WITH IMAGE TRANSFER MECHANISM. MAR. 6, 1962. CAN. 0622350, GRB. 0889664.
3,045,587.—ELECTROSTATIC PRINTING APPARATUS FOR FORMING MULTIPLE COPIES. JULY 24, 1962. CAN. 0682115, GRB. 0888867.
3,045,644.—TWO-COLOR ELECTROSTATIC PRINTING APPARATUS. JULY 24, 1962. CAN. 0634187, GRB. 0886766.
3,060,432.—ELECTROSTATIC RECORDING OF INFORMATION. OCT. 23, 1962.
3,064,259.—ELECTROSTATIC RECORDING OF INFORMATION. NOV. 13, 1962. CAN. 0736628.
3,068,481.—PROCESS AND APPARATUS FOR TESI-PRINTING. DEC. 11, 1962. CAN. 0709093, GRB. 0987234, JAP. 0446814.
3,091,762.—ELECTROSTATIC APPARATUS FOR MEASURING AND RECORDING TIME INTERVALS. MAY 28, 1963. CAN. 0620988, FRA. 1202341, GER. 1252149, GRB. 0880725, ITL. 0585388.
3,182,591.—IMAGE FORMING APPARATUS AND METHOD. MAY 11, 1965.
3,208,076.—ELECTROSTATIC PRINTER. SEPT. 21, 1965. GRB. 0999260.
3,217,330.—ELECTROSTATIC PRINTING UTILIZING PRINT-THROUGH RECORDING. NOV. 9, 1965. CAN. 0773752, GRB. 1001152.
3,234,359.—RECORD CARD SCANNING APPARATUS. FEB. 8, 1966.
3,234,904.—DEVICE FOR TESIPRINTING. FEB. 15, 1966. AUS. 0277492, CAN. 0804878, FRA. 1367728, GRB. 1024635, ITL. 0697883.
3,257,222.—ELECTROSTATIC RECORDING METHOD AND APPARATUS USING SHAPED ELECTRODES. JUNE 21, 1966. CAN. 0736231, GRB. 1027438, JAP. 0451019.
3,289,209.—ELECTROSTATIC MATRIX PRINTER. NOV. 29, 1966. CAN. 0707049, FRA. 1357858, GER. 1447873, GRB. 1018513, ITL. 0694321, JAP. 0440456.
3,342,126.—MULTIPLE ELECTROGRAPHIC PRINTER HAVING PLURAL UNITS CONNECTED TO COMMON DRIVE MEANS. SEPT. 19, 1967. CAN. 0825341, GRB. 1182685, JAP. 0648073.
3,348,232.—ASYNCHRONOUS PAGE-AT-A-TIME PRINTER. OCT. 17, 1967. CAN. 0709971, GRB. 1025487, JAP. 0462803.
3,358,592.—ELECTROGRAPHIC PRINTING. DEC. 19, 1967. CAN. 0896701, FRA. 1514749, GER. 1512401, GRB. 1182686, ITL. 0793834, MEX. 0098070.
3,430,254.—TESI PRINTING WITH FLEXIBLE ELECTRODE ON ENDLESS BELT. FEB. 25, 1969.
3,438,052.—AIR-SUPPORTED HOUSING CONTAINING TESI PRINTING DRUM. APR. 8, 1969. CAN. 0827330, GRB. 1149349.
3,495,269.—ELECTROGRAPHIC RECORDG METH AND APPRTS W/INERT GASEOUS DISCHARGE IONIZATION AND ACCELERATION GAPS. FEB. 10, 1970. ARG. 0174765, ATR. 0309208, AUS. 0413341, BEL. 0707986, CAN. 0865837, CZC. 0164808, FRA. 1551296, GRB. 1205790, ITL. 0819587, JAP. 0587936, MEX. 0103538, SPN. 0348328, SWD. 0346867, USR. 0291520.
3,599,225.—ELECTROSTATIC RECORDING APPARATUS - AIR GAP APERTURE BELT COMMUNICATIONS PRINTER. AUG. 10, 1971. CAN. 0882319, GRB. 1226436, JAP. 0675796.
3,644,930.—MULTI-STYLUS RECORDER. FEB. 22, 1972. ARG. 0181835, AUS. 0457379, BEL. 0751150, CAN. 0944812, CHL. 0025752, FRA. 7019463, GRB. 1297110, ITL. 0893693, MEX. 0119071, SPN. 0380273, SWD. 0368289, TIW. 0005822, VZL. 0027516.
3,673,600.—ELECTROGRAPHIC RECORDING METHOD AND APPARATUS. JUNE 27, 1972. CAN. 0947361, GRB. 1318605.
3,673,603.—RECIPROCATING CARRIAGE FOR ELECTROGRAPHIC PRINTING. JUNE 27, 1972. CAN. 0937629, GRB. 1346647.
3,686,676.—DUAL MODE ELECTROGRAPHIC RECORDER. AUG. 22, 1972. CAN. 0954293.
3,686,679.—MULTI-STYLUS RECORDING ASSEMBLY. AUG. 22, 1972.
3,714,665.—ELECTROSTATIC RECORDING WITH IMPROVED ELECTROSTATIC CHARGE RETENTION. JAN. 30, 1973.
3,717,880.—DUAL MODE ELECTROGRAPHIC RECORDING. FEB. 20, 1973. BEL. 0774564, CAN. 0948271, FRA. 7139638, GRB. 1366129, ITL. 0937674.
3,766,850.—DEVELOPING MEANS FOR ELECTROSTATIC PRINTING APPARATUS. OCT. 23, 1973. CAN. 0972551, FRA. 7246855, GRB. 1415325, ITL. 0973310, SWD. 7216975.
3,771,184.—PRINTING APPARATUS. NOV. 13, 1973. CAN. 0973704, FRA. 7246858, GRB. 1415200, ITL. 0973321, SWD. 7216973.
3,795,010.—WRITING APPARATUS AND METHOD OF MANUFACTURE. FEB. 26, 1974.
3,806,238.—FORMS OVERLAY TECHNIQUE USING TEST. APR. 23, 1974.
3,811,766.—DEVELOPING APPARATUS. MAY 21, 1974. ARG. 0183333, AUS. 0446187, BEL. 0747127, CAN. 0879412, EGR. 0084803, FRA. 7008249, GRB. 1296417, ITL. 0898245, JAP. 0770134, MEX. 0112930, SPN. 0377301, STZ. 0521614, SWD. 0361749, TIW. 0006826, USR. 0352484.
3,875,578.—ENVELOPED STYLUS RECORDER. APR. 1, 1975. CAN. 0947360, FRA. 7008242, GRB. 1296416.
3,971,042.—WRITING APPARATUS AND METHOD OF MANUFACTURE. JULY 20, 1976.

Class 1C 1

3,236,165.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 22, 1966. CAN. 0771829, JAP. 0547196.
3,343,142.—XEROGRAPHIC CODING AND INFORMATION STORAGE ON A SPECULAR BUSINESS MACHINE CARD. SEPT. 19, 1967. CAN. 0844786, GRB. 1047261, JAP. 0701182.
3,437,020.—MICROFILM TITLING APPARATUS. APR. 8, 1969. CAN. 0837780, GRB. 1191019, JAP. 0572188.
3,499,374.—XEROGRAPHIC PRINTER. MAR. 10, 1970. AUS. 0415164, BEL. 0677146, CAN. 0846424, FRA. 1470069, GRB. 1135603, ITL. 0762255, MEX. 0091183, SWD. 0327142.
3,521,950.—XEROGRAPHIC REPRODUCING APPARATUS. JULY 28, 1970. ARG. 0184148, ATR. 0317675, AUS. 0441739, BEL. 0713876, CAN. 0877511, CHL. 0024535, DNK. 0129304, FRA. 1558225, GRB. 1231622, GRK. 0037839, IND. 0124668, ISR. 0029824, ITL. 0831700, JAM. 0001853, JAP. 0774498, LXB. 0055912, MEX. 0102085, NOR. 0131313, NZL. 0159801, PRU. 0009366, PTG. 0049474, SAF. 6872518, SPN. 0352885, STZ. 0505015, SWD. 7012263, UAR. 0008668, URG. 0009239, VZL. 0025077.
3,689,143.—REPRODUCING MACHINE. SEPT. 5, 1972.

Class 1C 2

2,816,493.—ELECTROPHOTOGRAPHIC MICROFILM ENLARGER. DEC. 17, 1957.
3,094,036.—IMAGE SELECTOR APPARATUS. JUNE 18, 1963. CAN. 0683832.
3,236,165.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 22, 1966. CAN. 0771829, JAP. 0547196.
3,379,106.—XEROGRAPHIC REPRODUCTION APPARATUS. APR. 23, 1968. ATR. 0300567, AUS.

0416116, BEL. 0674602, CAN. 0821718, DNK. 0117045, FRA. 1475712, GRB. 1135742, ITL. 0750206, MEX. 0095580, SPN. 0321099, STZ. 0509924, SWD. 6912065.

3,480,360.—XEROGRAPHIC COPYING APPARATUS. NOV. 25, 1969. ARG. 0180571, ATR. 0301344, AUS. 0310556, BEL. 0704978, CAN. 0870794, CHL. 0023569, FRA. 1540839, GRB. 1206964, GRK. 0035147, HUN. 0158496, IND. 0112715, ITL. 0827017, LXB. 0054635, MEX. 0102269, NZL. 0156632, PRU. 0009341, PTG. 0048460, SAF. 0676065, SPN. 0345998, STZ. 0487439, SWD. 0337743, URG. 0008847, VZL. 0023675.

3,592,539.—RECORDING APPARATUS. JULY 13, 1971. CAN. 0917230.

3,689,143.—REPRODUCING MACHINE. SEPT. 5, 1972.

Class 1C 3

3,130,411.—ELECTRONIC RECORDER. APR. 21, 1964. CAN. 0729326.

3,212,888.—METHOD FOR DEVELOPING LATENT ELECTROSTATIC CHARGE HALFTONE IMAGES. OCT. 19, 1965. GER. 1284302, GRB. 1017683, JAP. 0470423.

3,281,857.—XEROGRAPHIC TRANSFER PLATEN. OCT. 25, 1966. CAN. 0733683, GRB. 1025199.

3,535,036.—APPARATUS FOR FORMING HALF-TONE LINE SCREEN WITH A LENS. OCT. 20, 1970. CAN. 0909309, GRB. 1253887.

3,698,893.—METHODS OF ORGANIZED THERMOPLASTIC XEROGRAPHY AND PHOTORECEPTOR STRUCTURE THEREFOR. OCT. 17, 1972.

3,873,310.—METHOD OF CONTROLLING THE BRIGHTNESS ACCEPTANCE RANGE AND TONAL CONTRAST OF XEROGRAPHIC PLATE. MAR. 25, 1975. GRB. 1414951.

3,905,822.—COMPOUND SCREEN FOR OBJECT SCREENING. SEPT. 16, 1975. GRB. 1459558.

3,912,510.—ELECTROPHOTOGRAPHIC PROCESS EMPLOYING A COMPOUND DOCUMENT SCREEN. OCT. 14, 1975. GRB. 1459558.

4,013,355.—NOTCH FILTER FOR COLOR TRANSPARENCY COPYING MACHINES. MAR. 22, 1977.

4,014,607.—REMOVABLE SCREENING SYSTEM FOR A TRANSPARENCY REPRODUCTION MACHINE. MAR. 29, 1977.

4,025,181.—A SCREEN CLEANING DEVICE. MAY 24, 1977.

Class 1C 4

3,196,009.—ELECTROSTATIC IMAGE LIQUID DEFORMATION DEVELOPMENT. JULY 20, 1965. ATR. 0267320, AUS. 0273895, BEL. 0631984, CAN. 0768329, DNK. 0129676, FRA. 1408156, GER. 1497058, GRB. 1043981, HOL. 0134043, ISR. 0019144, ITL. 0695213, JAP. 0620918, LXB. 0043704, MEX. 0080571, NOR. 0123260, SAF. 0001947, STZ. 0448745, SWD. 0315502.

3,196,010.—ELECTROPHOTOGRAPHIC PROCESS FOR FORMATION OF DEFORMATION IMAGES IN DEFORMABLE INTERFERENCE FILM. JULY 20, 1965. CAN. 0790232, FRA. 1364100, GRB. 1036738, ITL. 0695214, JAP. 0510166.

3,196,012.—HALF-TONE XEROGRAPHY WITH THERMOPLASTIC DEFORMATION OF THE IMAGE. JULY 20, 1965. CAN. 0760623, FRA. 1359565, GER. 1497060, GRB. 1040836, ITL. 0697483, JAP. 0478444.

3,196,013.—XEROGRAPHIC INDUCTION RECORDING WITH MECHANICALLY DEFORMABLE IMAGE FORMATION IN A DEFORMABLE LAY. JULY 20, 1965. CAN. 0778520, FRA. 1360084, GER. 1253581, ITL. 0711488, JAP. 0649672.

3,307,941.—PLASTIC DEFORMATION IMAGING FILM AND PROCESS. MAR. 7, 1967. CAN. 0801262.

3,419,885.—IMAGE DEVELOPMENT OF THERMOPLASTIC LAYERS. DEC. 31, 1968. CAN. 0785985, GRB. 1117644, JAP. 0537663.

3,436,216.—IMAGE STORAGE COMPRISING A THERMOPLASTIC DEFORMATION PATTERN. APR. 1, 1969. CAN. 0807326, FRA. 1488094, GRB. 1160731, ITL. 0774940.

3,445,227.—ELECTROPHOTOGRAPHIC IMAGING PROCESSES EMPLOYING 2,4 DIAMINOTRIAZINES AS ELCTRCLY PHOTOSNSTV PRT. MAY 20, 1969. BEL. 0743891, CAN. 0852681, GER. 1522687, GRB. 1146019, JAP. 0617789.

3,448,028.—N-SBSTUD-8,13-DIOXODINAPHTHO-2-1-B,2,3-D-FURAN-6-CARBOXAMIDES AS ELCTLY PTOSNSTV MTLS IN ELCPHG. JUNE 3, 1969.

3,448,029.—ELECTROPHORETIC IMAGING PROCESS USING 8,13-DIOXODINAPTHO-2,1-B,2,3-D-FURAN-6-CARBOXAMIDE PIGMEN. JUNE 3, 1969.

3,448,030.—ELECTRICALLY PHOTOSENSITIVE PART. USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROCESSE. JUNE 3, 1969. BEL. 0743893, CAN. 0943830, GRB. 1155554, JAP. 0686735.

3,698,892.—METHODS OF THERMOPLASTIC XEROGRAPHY AND APPARATUS THEREFOR. OCT. 17, 1972. CAN. 0949117, GRB. 1343191.

3,698,893.—METHODS OF ORGANIZED THERMOPLASTIC XEROGRAPHY AND PHOTORECEPTOR STRUCTURE THEREFOR. OCT. 17, 1972.

3,716,359.—CYCLIC RECORDING SYSTEM BY THE USE OF AN ELASTOMER IN AN ELECTRIC FIELD. FEB. 13, 1973. ARG. 0196734, AUS. 0461213, BEL. 0777320, CAN. 0953990, FRA. 7147891, GRB. 1380057, ITL. 0944392, MEX. 0131400, SPN. 0398306.

3,719,483.—METHODS OF ORGANIZED THERMOPLASTIC XEROGRAPHY AND PHOTORECEPTOR STRUCTURE THEREFOR. MAR. 6, 1973.

3,730,621.—CONTROL OF ELECTROSTATIC DEFORMATION OF THERMOPLASTIC FILM. MAY 1, 1973.

3,795,514.—DEFORMATION IMAGING METHOD. MAR. 5, 1974.

3,842,406.—CYCLIC RECORDING SYSTEM BY THE USE OF AN ELASTOMER IN AN ELECTRIC FIELD. OCT. 15, 1974. ARG. 0196734, AUS. 0461213, BEL. 0777320, CAN. 0953990, FRA. 7147891, GRB. 1380057, ITL. 0944392, MEX. 0131400, SPN. 0398306.

3,858,973.—METHODS OF THERMOPLASTIC XEROGRAPHY AND APPARATUS THEREFOR. JAN. 7, 1975. CAN. 0949117, GRB. 1343191.

3,888,591.—IMAGE SUBTRACTION APPARATUS. JUNE 10, 1975.

3,932,025.—IMAGING SYSTEM. JAN. 13, 1976.

3,944,358.—COLOR IMAGE REPRODUCTION SYSTEMS. MAR. 16, 1976.

3,946,433.—PHASE IMAGE SCANNING METHOD. MAR. 23, 1976. BEL. 0835551.

3,951,533.—COLOR IMAGE REPRODUCTION SYSTEM. APR. 20, 1976.

3,961,950.—IMAGING SYSTEM. JUNE 8, 1976.

3,980,476.—IMAGING SYSTEM. SEPT. 14, 1976.

3,997,243.—COLOR IMAGE REPRODUCTION SYSTEM. DEC. 14, 1976.

3,999,988.—METHOD FOR REAL-TIME COLOR MASKING. DEC. 28, 1976.

4,018,603.—DEFORMATION IMAGING SYSTEM USING THERMOPLASTIC AND ELASTOMERIC LAYERS. APR. 19, 1977.

4,021,236.—IMAGING SYSTEM. MAY 3, 1977.

4,023,969.—DEFORMABLE ELASTOMER IMAGING MEMBER EMPLOYING AN INTERNAL OPAQUE DEFORMABLE METALLIC LAYER. MAY 17, 1977.

Class 1C 4A

3,196,008.—ELECTROPC PRCS FOR FRMTN OF FRST LIKE DEFRMTN IMGS IN MECHANICALLY DEFRMBL PHOTOCONDUCTIVE LAYER. JULY 20, 1965. CAN. 0844221.

3,196,011.—ELECTROSTATIC FROSTING. JULY 20, 1965. ARG. 0150575, ATR. 0256625, AUS. 0275848, BEL. 0631983, BRA. 0082433, CAN. 0918226, CHL. 0019655, EIR. 0027268, FIN. 0044982, FRA. 1364101, GER. 1295371, GRB. 1039881, GRK. 0026981, HOL. 0140635, IND. 0087685, ISR. 0019143, ITL. 0695215, LXR. 0043693, MEX. 0102124, NOR. 0118346, NZL. 0134799, PAK. 0114430, PLP. 0003269, PTG. 0040894, SAF. 0001948, SPN. 0292129, STZ. 0425467, SWD. 0315201, TRK. 0011937, UAR. 0004997, VTM. 0000992, VZL. 0014488.

3,213,429.—HIGH SPEED INFORMATION RECORDER. OCT. 19, 1965.

3,258,336.—STRIPPABLE LAYER FROST PRINTING. JUNE 28, 1966. CAN. 0815184.

3,322,034.—FROST COLOR DISPLAY. MAY 30, 1967.

3,329,500.—ELECTROSTATIC FROSTING. JULY 4, 1967.

3,482,969.—FIXING OF DEFORMATION IMAGES. DEC. 9, 1969. CAN. 0801883, FRA. 1399003, GRB. 1061235, ITL. 0726200, SWD. 0315806.

3,485,623.—CONTINUOUS TONE THERMOPLASTIC PHOTOGRAPHY. DEC. 23, 1969. CAN. 0810834, GRB. 1181093, JAP. 0565795.

3,526,879.—INTERNAL FROST RECORDING APPARATUS USING A DEFORMABLE PHOTOCONDUCTOR. SEPT. 1, 1970.

3,542,545.—FROST OR RELIEF WRNKLNG OF AN IMGNG ARTCL COMPRSNG AN ELCTRCLY PHOTSNSTV LAYER AND DEFORMABLE LAY. NOV. 24, 1970. ARG. 0174588, ATR. 0300563, AUS. 0424162, BEL. 0726280, CAN. 0928764, CHL. 0025764, DNK. 0126400,

FRA. 1604336, GER. 1817226, GRB. 1234600, GUA. 0002531, ITL. 0864015, JAP. 0693385, LXB. 0057697, MEX. 0107799, NZL. 0154931, PNM. 0001803, PRU. 0010480, SAF. 0688517, SPN. 0362039, STZ. 0518578, SWD. 0354132, URG. 0009690.

3,560,205.—METHOD OF FORMING A PHASE MODULATING HOLOGRAM ON A DEFORMABLE THERMOPLASTIC. FEB. 2, 1971. CAN. 0949793, GRB. 1162853.

3,560,206.—PRODUCTION OF LATENT PERODIC MEMORY PATTERNS IN FROSTABLE FILMS. FEB. 2, 1971.

3,561,958.—INDUCING FROST DEFORMATION IMAGING BY ELECTROLYTIC DEPOSITION. FEB. 9, 1971.

3,672,883.—CRYSTALLINE POLYMERS FOR FROST. JUNE 27, 1972.

3,672,886.—NOVOLAR RESINS IN DEFORMATION IMAGING. JUNE 27, 1972.

3,764,311.—IMAGING SYSTEM. OCT. 9, 1973.

3,819,369.—SURFACE DEFORMABLE IMAGING MEMBER OF IMPROVED DARK DECAY CHARACTERISTICS. JUNE 25, 1974.

3,923,504.—MIGRATION IMAGING MEMBER AND METHOD. DEC. 2, 1975. GRB. 1461872.

3,926,626.—CIRCULATION IMAGING METHOD. DEC. 16, 1975.

Class 1C 4B

3,238,041.—RELIEF IMAGING OF PHOTORESPONSIVE MEMBER AND PRODUCT. MAR. 1, 1966. CAN. 0850841, GRB. 1043983, MEX. 0080410.

3,321,308.—XEROGRAPHIC INDUCTION RECORDING. MAY 23, 1967. CAN. 0778521, FRA. 1393821, GRB. 1049903, ITL. 0801906, JAP. 0537660.

3,542,545.—FROST OR RELIEF WRNKLNG OF AN IMGNG ARTCL COMPRSNG AN ELCTRCLY PHOTSNSTV LAYER AND DEFORMABLE LAY. NOV. 24, 1970. ARG. 0174588, ATR. 0300563, AUS. 0424162, BEL. 0726280, CAN. 0928764, CHL. 0025764, DNK. 0126400, FRA. 1604336, GER. 1817226, GRB. 1234600, GUA. 0002531, ITL. 0864015, JAP. 0693385, LXB. 0057697, MEX. 0107799, NZL. 0154931, PNM. 0001803, PRU. 0010480, SAF. 0688517, SPN. 0362039, STZ. 0518578, SWD. 0354132, URG. 0009690.

3,615,388.—DEFORMATION IMAGING PROCESS AND ELEMENT. OCT. 26, 1971. CAN. 0941877, MEX. 0101539.

3,923,504.—MIGRATION IMAGING MEMBER AND METHOD. DEC. 2, 1975. GRB 1461872.

3,926,626.—CIRCULATION IMAGING METHOD. DEC. 16, 1975.

Class 1C 5

2,817,765.—XEROGRAPHIC METHOD. DEC. 24, 1957.

2,968,553.—XEROGRAPHIC APPARATUS AND METHOD. JAN. 17, 1961. CAN. 0624329.

3,519,818.—METHOD OF PREPARING A NEGATIVE XEROGRAPHIC REPRODUCTION FROM A POSITIVE LINE COPY IMAGE. JULY 7, 1970. CAN. 0829037, GRB. 1191159, JAP. 0589516.

Class 1D

3,318,212.—DUPLEX XEROGRAPHIC REPRODUCTION. MAY 9, 1967.

3,506,347.—DUPLEX XEROGRAPHIC REPRODUCTION APPARATUS. APR. 14, 1970.

3,536,398.—REPRODUCTION APPARATUS. OCT. 27, 1970. AUS. 0442047, BEL. 0737274, CAN. 0899443, EGR. 0091200, FRA. 6927759, GRB. 1246226, ITL. 0883645, SPN. 0370416, STZ. 0500517, SWD. 0356144, TIW. 0005358, USR. 0359871.

3,580,670.—APPARATUS FOR DUPLEXING. MAY 25, 1971. CAN. 0929581.

3,615,129.—DUPLEXING XEROGRAPHIC REPRODUCING MACHINE WITH COPY SHEET REVERSING STATION. OCT. 26, 1971. ARG. 0172601, AUS. 0432830, BEL. 0737341, CAN. 0909853, CZC. 0158650, EGR. 0083299, FRA. 6927784, GRB. 1256767, ITL. 0883644, JAP. 0774495, MEX. 0108784, SPN. 0370415, STZ. 0500518, SWD. 0356143, TIW. 0006822, USR. 0371736, VZL. 0032923.

3,671,118.—APPARATUS FOR CREATING DUPLEX REPRODUCTIONS. JUNE 20, 1972. ARG. 0186265, AUS. 0445064, BEL. 0760746, CAN. 0922768, EGR. 0088254, FRA. 7047143, GRB. 1282808, ITL. 0913849, JAP. 0773214, MEX. 0116655, SPN. 0386707, STZ. 0526137, SWD. 0366403.

3,674,475.—ENCLOSED MIGRATION IMAGING SYSTEM. JULY 4, 1972.

3,694,073.—METHOD FOR DUPLEXING. SEPT. 26, 1972.

3,754,822.—SCANNING SYSTEM. AUG. 28, 1973.

3,844,653.—ROOF MIRROR COPYING SYSTEM. OCT. 29, 1974.

3,844,654.—DUPLEX COPYING SYSTEM. OCT. 29, 1974. FRA. 7340246.

3,847,478.—SEGMENTED BIAS ROLL. NOV. 12, 1974.

3,936,171.—ELECTROSTATOGRAPHIC METHODS AND APPARATUS. FEB. 3, 1976.

3,940,210.—PROGRAMMABLE CONTROLLER FOR CONTROLLING REPRODUCTION MACHINES. FEB. 24, 1976. BEL. 0832356, IRN. 0013436.

3,944,359.—PROGRAMMABLE CONTROLLER FOR CONTROLLING REPRODUCTION MACHINES. MAR. 16, 1976.

4,014,609.—PROGRAMMABLE CONTROLLER FOR CONTROLLING REPRODUCTION MACHINE. MAR. 29, 1977.

4,035,073.—DUPLEX REPRODUCTION MACHINE. JULY 12, 1977. BEL. 0832115, SPN. 0440012.

Class 1E

2,962,374.—COLOR XEROGRAPHY. NOV. 29, 1960.

2,962,375.—COLOR XEROGRAPHY. NOV. 29, 1960.

3,043,686.—XEROGRAPHIC COLOR MASKING. JULY 10, 1962. CAN. 0663888.

3,057,720.—XEROGRAPHIC COLOR REPRODUCTION. OCT. 9, 1962. GRB. 0956772.

3,227,549.—MULTIPLE IMAGE FORMING XEROGRAPHIC REPRODUCTION PROCESS. JAN. 4, 1966.

3,313,623.—LINE SEQUENTIAL COLOR XEROGRAPHY. APR. 11, 1967. CAN. 0880483, GRB. 1019974.

3,316,805.—COLOR DISPLAY. MAY 2, 1967.

3,357,830.—DYED IMAGE XEROGRAPHY. DEC. 12, 1967. CAN. 0821484, GER. 1277018, GRB. 1016581, ITL. 0679720, JAP. 0477809.

3,373,091.—DATA STORAGE DEVICE AND METHOD. MAR. 12, 1968.

3,386,379.—DUPLICATING WITH COLOR PRODUCING REAGENTS. JUNE 4, 1968. AUS. 0294747, CAN. 0842445, FRA. 1390006, GER. 1249089, GRB. 1043875, ITL. 0801548, JAP. 0611643.

3,468,705.—METHOD OF PREPARING LEAD OXIDE FILMS. SEPT. 23, 1969. CAN. 0806134, FRA. 1501511, GER. 1521942, GRB. 1170428, ITL. 0787638, JAP. 0634868, MEX. 0093335.

3,508,823.—DUPLICATING APPARATUS. APR. 28, 1970.

3,583,806.—DYED IMAGE XEROGRAPHY. JUNE 8, 1971.

3,615,392.—ELECTROPHORETIC REPRODUCTION ORIGINAL CONTAINING BOTH MULTI-COLOR AND LINE AREAS. OCT. 26, 1971.

3,672,887.—ELECTROPHOTOGRAPHIC PROCESS FOR MULTICOLOR REPRODUCTION. JUNE 27, 1972.

3,687,661.—COLOR ELECTROPHOTOGRAPHIC PROCESS. AUG. 29, 1972. CAN. 0932785.

3,690,756.—COLOR XEROGRAPHY. SEPT. 12, 1972. BEL. 0781001, CAN. 0963522, FRA. 7210584, GRB. 1365753, ITL. 0950399.

3,702,483.—COLOR RENDITION METHOD. NOV. 7, 1972. BEL. 0777015, CAN. 0935334, FRA. 7146255, GRB. 1361647, ITL. 0944210.

3,719,482.—IMAGING SYSTEM. MAR. 6, 1973.

3,724,943.—COLOR REPRODUCTION APPARATUS. APR. 3, 1973. CAN. 0946463.

3,734,607.—COLOR REPRODUCTION APPARATUS. MAY 22, 1973. ARG. 0184654, ATR. 0314352, AUS. 0459724, BEL. 0751490, CAN. 0946462, CHL. 0026265, DNK. 0130156, EGR. 0085001, FRA. 7020455, GRB. 1316499, ITL. 0893863, MEX. 0120285, NZL. 0160302, PNM. 0002259, PTG. 0053890, SAF. 0703775, SPN. 0380376, STZ. 0514164, SWD. 0359176.

3,799,668.—COLOR STANDARD AND METHOD OF CALIBRATING A MULTI-COLOR ELECTROPHOTGRAPHIC PRINTING MACHINE. MAR. 26, 1974. BEL. 0812179, SAF. 0741562.

3,799,774.—MULTI COLOR ELECTROPHOTOGRAPHIC MASKING PROCESS. MAR. 26, 1974.

3,805,283.—CHART CREATION APPARATUS. APR. 16, 1974.

3,869,203.—COLOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. MAR. 4, 1975. BEL. 0820041.

3,884,686.—COLOR CORRECTION METHOD. MAY 20, 1975.

3,909,127.—MULTI-COLOR ORIGINAL FOR AN ELECTROPHOTOGRAPHIC PRINTING SYSTEM. SEPT. 30, 1975.

3,914,043.—COLOR ACCENTING COPYING MACHINE. OCT. 21, 1975.

3,936,182.—CONTROL ARRANGEMENT FOR AN ELECTROSTATOGRAPHIC REPRODUCTION APPARATUS. FEB. 3, 1976.
3,944,711.—TRANSPARENCY. MAR. 16, 1976.
3,958,990.—TRANSFERRING TONER TO AN AMINE COATED SHEET. MAY 25, 1976.
3,960,445.—COLOR HIGHLIGHTING ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 1, 1976.
3,963,341.—A COLOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 15, 1976.
3,970,042.—COLOR DEVELOPMENT APPARATUS. JULY 20, 1976.
3,999,987.—COLOR REPRODUCTION METHOD. DEC. 28, 1976.
4,013,355.—NOTCH FILTER FOR COLOR TRANSPARENCY COPYING MACHINES. MAR. 22, 1977.
4,014,696.—MULTICOLORED XEROGRAPHIC TRANSPARENCY UTILIZING AN APIPHATIC ESTER COATING. MAR. 29, 1977.
4,027,962.—COLOR TRANSPARENCY REPRODUCING MACHINE. JUNE 7, 1977. BEL. 0830321, IRN. 0013435, SPN. 0437814.

Class 1F

2,637,651.—METHOD OF PRODUCING IMAGES ON RIGID SURFACES. MAY 5, 1953. CAN. 0508329.
2,885,955.—XEROGRAPHIC MACHINE. MAY 12, 1959.
2,949,848.—STENCIL MAKING. AUG. 23, 1960. CAN. 0571449.
2,952,536.—METHOD OF PREPARING A LITHOGRAPHIC PRINTING PLATE. SEPT. 13, 1960.
2,954,291.—METHOD FOR PREPARING A SPIRIT DUPLICATING MASTER. SEPT. 27, 1960. CAN. 0583832.
2,955,035.—RAISED XEROGRAPHIC IMAGES. OCT. 4, 1960.
2,955,052.—METHOD OF FORMING A RAISED IMAGE. OCT. 4, 1960.
2,955,531.—STENCIL MASTER FORMATION. OCT. 11, 1960.
3,109,366.—METHOD FOR PATTERN REPRODUCTION. NOV. 5, 1963. CAN. 0624372.
3,109,367.—METHOD FOR PATTERN REPRODUCTION. NOV. 5, 1963. CAN. 0624374, FRA. 1146623, GER. 1029837, GRB. 0813637.
3,143,066.—PRODUCTION OF DUPLICATING MASTERS. AUG. 4, 1964. CAN. 0722954.
3,428,453.—IMAGE FORMING PROCESS UTILIZING XEROGRAPHY-ETCHING PROCESS. FEB. 18, 1969. CAN. 0856722, FRA. 1428775, GRB. 1085151, ITL. 0754825.
3,455,240.—IMAGING SYSTEM. JULY 15, 1969. CAN. 0823599, GER. 1571913, GRB. 1165676, JAP. 0594700.
3,460,476.—IMAGING PROCESS. AUG. 12, 1969. ARG. 0164839, AUS. 0418783, BEL. 0691755, CAN. 0882050, FRA. 1511173, GRB. 1168268, ITL. 0787662, JAP. 0562388, MEX. 0108240, SPN. 0346128, STZ. 0480672, SWD. 0331794, VZL. 0024009.
3,490,368.—PRINTING BY PARTICULATE IMAGES. JAN. 20, 1970. ARG. 0152222, ATR. 0281875, AUS. 0403243, BEL. 0674293, BRA. 0086720, CAN. 0824922, DNK. 0117303, FIN. 0047145, FRA. 1464987, GER. 1496169, GRB. 1128173, GRK. 0031516, HOL. 0145056, ITL. 0750153, JAP. 0547199, MEX. 0101075, NOR. 0130551, SAF. 0656968, SPN. 0321274, STZ. 0446906, SWD. 0355681, VZL. 0023998.
3,549,447.—IMAGING SYSTEM. DEC. 22, 1970.
3,559,570.—METHOD OF PREPARING AND USING A GRAVURE PRINTING PLATE. FEB. 2, 1971. CAN. 0844544, GRB. 1198142.
3,589,290.—RELIEF IMAGING PLATES MADE BY REPETITIVE XEROGRAPHIC PROCESSES. JUNE 29, 1971. CAN. 0896949.
3,615,128.—APPARATUS FOR ELECTROSTATIC PRINTING. OCT. 26, 1971. CAN. 0910956.
3,638,567.—METHOD OF PREPARING AND UTILIZING A GRAVURE PRINTING MASTER. FEB. 1, 1972.
3,806,354.—METHOD OF DEVELOPING ELECTROSTATIC LATENT IMAGES. APR. 23, 1974.
3,884,686.—COLOR CORRECTION METHOD. MAY 20, 1975.
3,919,938.—PERMANENT ELECTROSTATIC MASTER. NOV. 18, 1975.
4,006,267.—COLOR HIGHLIGHTING PROCESS. FEB. 1, 1977.

Class 1G 1

3,043,685.—XEROGRAPHIC AND MAGNETIC IMAGE RECORDING AND REPRODUCING. JULY 10, 1962. CAN. 0611005, FRA. 1207840, GRB. 0902481.
3,093,039.—APPARATUS FOR TRANSFERRING POWDER IMAGES AND METHOD THEREFOR. JUNE 11, 1963. CAN. 0744873.
3,124,457.—DIFFERENTIAL IMAGE TRANSFER SYSTEM. MAR. 10, 1964. CAN. 0800184, GRB. 1031986, JAP. 0477375.
3,185,777.—MAGNETIC RECORDING. MAY 25, 1965.
3,485,621.—RECORDING BY PARTICLE ORIENTATION. DEC. 23, 1969. CAN. 0916777, GRB. 1188982, JAP. 0582501.
3,526,191.—DUPLICATING PROCESS EMPLOYING MAGNETIC DEVELOPER MATERIAL. SEPT. 1, 1970. CAN. 0903830, GRB. 1208307.
3,803,638.—RECORDING SYSTEM USING MAGNETIC CORE MATRIX. APR. 9, 1974.
3,875,576.—ELECTROSTATIC IMAGING SYSTEM WITH MAGNETIC TONER. APR. 1, 1975.

Class 1G 2

2,756,676.—METHOD FOR THE PRODUCTION OF ELECTROPHOTOGRAPHIC PRINTS. JULY 31, 1956. CAN. 0564672.
2,868,642.—ELECTROPHOTOGRAPHIC METHOD. JAN. 13, 1959. CAN. 0569364, FRA. 1146633, GER. 1050189, GRB. 0812419.
2,919,179.—RESIST FORMING METHOD. DEC. 29, 1959. CAN. 0616771.
3,592,642.—DUPL METH PAPR SHT HTS MELTG PT TONR IMG SIMUL CAUSE TRANSF TNR FRPHOTOCNDCR AND FSG TNR IMG ON PAP. JULY 13, 1971. BEL. 0706852, FRA. 1547828, GRB. 1198306, HUN. 0157321, ITL. 0815498.

Class 1G 3

3,275,436.—METHOD OF IMAGE REPRODUCTION UTILIZING A UNIFORM RELEASABLE SURFACE FILM. SEPT. 27, 1966. AUS. 0296158, CAN. 0811877, FRA. 1371894, GRB. 1033523, ITL. 0702168, JAP. 0508402.
3,438,772.—IMG RPDCTN INVLVNG ELCTROSTC TRSF OF RELESBL DONR FILM FRM PTOCNDTV INSLTNG LAYER TO ADHSV TRS. APR. 15, 1969. CAN. 0838044, GRB. 1124954, JAP. 0542587.
3,446,616.—XEROGRAPHIC IMAGING EMPLOYING A SELECTIVELY REMOVABLE LAYER. MAY 27, 1969.

Class 1G 4

2,968,552.—XEROGRAPHIC APPARATUS AND METHOD. JAN. 17, 1961. AUS. 0222058, CAN. 0624328, FRA. 1197798, GER. 1197326, GRB. 0876577.
3,166,418.—IMAGE DEVELOPMENT. JAN. 19, 1965. CAN. 0747566, FRA. 1259438, GER. 1190334, GRB. 0952609, JAP. 0418117.
3,619,054.—OIL FILM IMAGING APPARATUS. NOV. 9, 1971.

Class 1G 5

3,234,019.—METHOD FOR FORMATION OF AN ELECTROSTATIC IMAGE RESISTANT TO DETERIORATION ON STORAGE. FEB. 8, 1966. ATR. 0248873, AUS. 0266424, BEL. 0618720, FRA. 1325903, GER. 1295374, GRB. 1006231, IND. 0081730, ISR. 0017057, ITL. 0667262, SAF. 0001489, STZ. 0407176, SWD. 0307733.

Class 1G 6

3,084,043.—LIQUID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGES. APR. 2, 1963. CAN. 0678365, GRB. 0880597.
3,869,896.—ROLLING PROCESS. MAR. 11, 1975. GRB. 1434131.
3,924,945.—APPARATUS FOR INDUCTIVE IMAGING WITH SIMULTANEOUS POLAR INK DEVELOPMENT. DEC. 9, 1975.
3,974,554.—QUANDRANGULAR TRIPETICORD GRAVURE ROLL. AUG. 17, 1976.
3,980,404.—XEROGRAPHIC APPARATUS HAVING IMPROVED FLUID DISPENSING MEMBER. SEPT. 14, 1976.
3,994,726.—LAMINATED FLEXIBLE PHOTORECEPTOR. NOV. 30, 1976. GRB. 1429517.

4,002,476.—METHOD OF DEVELOPING RESILIENT PHOTOCONDUCTIVE ELEMENT. JAN. 11, 1977. GRB. 1429517.
4,017,174.—DEVELOPER ASSEMBLY SUPPORT. APR. 12, 1977.
4,020,788.—DOCTORING MEANS. MAY 3, 1977.
4,023,967.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPMENT METHOD IN WHICH A UNIFORM SUBSTANTIAL INTERFACE CONTACT. MAY 17, 1977. BEL. 0819537.
4,024,838.—DEVELOPER LIQUID SUPPLY DEVICE. MAY 24, 1977.

Class 1H 1

3,100,427.—PROJECTION DEVICE. AUG. 13, 1963.
3,166,419.—IMAGE PROJECTION. JAN. 19, 1965. CAN. 0699802, FRA. 1260843, GRB. 0955994.
3,166,420.—SIMULTANEOUS IMAGE FORMATION. JAN. 19, 1965. CAN. 0756267, GRB. 0955142.
3,185,050.—XEROGRAPHIC IMAGE PROCESSOR PROJECTOR. MAY 25, 1965.
3,196,765.—IMAGE DEVELOPMENT AND PROJECTION. JULY 27, 1965.
3,220,012.—SIMULTANEOUS RECORDING AND DISPLAY SYSTEM. NOV. 23, 1965. CAN. 0809339, FRA. 1373673, GER. 1303156, GRB. 1019900, ITL. 0695895, JAP. 0470425.
3,317,317.—XEROGRAPHIC METHOD OF MAKING A PARTICLE TRANSPARENCY PROJECTIBLE IMAGE. MAY 2, 1967.
3,320,061.—MASKING BY TOTAL INTERNAL REFLECTION FOR IMAGE REPRODUCTION AND DISPLAY. MAY 16, 1967. CAN. 0847533, FRA. 1401615, GER. 1497081, GRB. 1065986, ITL. 0729029, JAP. 0471308.
3,343,142.—XEROGRAPHIC CODING AND INFORMATION STORAGE ON A SPECULAR BUSINESS MACHINE CARD. SEPT. 19, 1967. CAN. 0844786, GRB. 1047261, JAP. 0701182.
3,519,344.—IMAGE PROJECTION. JULY 7, 1970.
3,543,031.—DEVICE AND PROCESS FOR IMAGE STORAGE. NOV. 24, 1970. ARG. 0161299, AUS. 0432468, BEL. 0703461, CAN. 0862332, FRA. 1543309, GER. 1549142, GRB. 1201374, ITL. 0811521, JAP. 0742514, MEX. 0100142, SPN. 0344004, STZ. 0497022, SWD. 0354169, VZL. 0023663.
3,593,832.—KEYBOARD INPUT DISPLAY DEVICE. JULY 20, 1971.
3,619,049.—XEROGRAPHIC IMAGERY USING A LONG PERSISTENCE PHOSPHOR INTERMEDIATE. NOV. 9, 1971.
3,955,977.—ELECTROSTATOGRAPHIC PROCESS. MAY 11, 1976.

Class 1H 2

3,437,408.—MULTIPLE COPY ELECTROSTATIC IMAGING APPARATUS. APR. 8, 1969. ARG. 0164840, ATR. 0283115, AUS. 0410817, BEL. 0704323, CAN. 0831674, CZC. 0156411, EGR. 0065587, FRA. 1538197, GRB. 1202583, HUN. 0161168, ITL. 0822157, JAP. 0582502, MEX. 0099950, SPN. 0345482, STZ. 0484459, SWD. 0331795, USR. 0353450, VZL. 0023662.
3,512,038.—PIN SYSTEM. MAY 12, 1970. CAN. 0873507, GRB. 1201497, JAP. 0623001.

Class 1I

3,011,473.—XEROGRAPHIC APPARATUS. DEC. 5, 1961. CAN. 0675698, GRB. 0971972.
3,041,167.—XEROGRAPHIC PROCESS. JUNE 26, 1962.
3,414,409.—PARTICLE TRANSFER. DEC. 3, 1968. BEL. 0713399, CAN. 0822324, FRA. 1568374, GRB. 1145026, ITL. 0829803.
3,543,022.—METH AND APPARATUS CHARG DISCRETE SMALL AREAS XEROGRAPHIC PLATES TO DIF POTENT CONT TONE PRINTG. NOV. 24, 1970. CAN. 0921971, GRB. 1186599.
3,682,677.—BACKGROUND REMOVAL. AUG. 8, 1972.
3,784,301.—ELECTROPHOTOGRAPHIC METHOD. JAN. 8, 1974.
3,883,349.—ELECTROPHOTOGRAPHIC CHARGING METHOD. MAY 13, 1975.
3,973,846.—ELECTROSTATIC MASTER MAKING APPARATUS. AUG. 10, 1976.
4,021,112.—PHOTORECEPTOR DARK CURRENT LEAKAGE DETECTING APP FOP XEROGRAPHIC MACHINES. May 3, 1977.

Class 1J

2,221,776.—ELECTRON PHOTOGRAPHY. NOV. 19, 1940.
2,588,699.—ELECTROPHOTOGRAPHIC APPARATUS. MAR. 11, 1952.
2,598,732.—ELECTROPHOTOGRAPHY. JUNE 3, 1952.
3,652,156.—LINEAR-TO-DRUM OPTICAL SCAN CONVERTER SYSTEM. MAR. 28, 1972.
3,766,850.—DEVELOPING MEANS FOR ELECTROSTATIC PRINTING APPARATUS. OCT. 23, 1973. CAN. 0972551, FRA. 7246855, GRB. 1415325, ITL. 0973310, SWC. 7216975.
3,954,463.—METHOD FOR ELECTROSTATIC PRINTING. MAY 4, 1976.

Class 1J 1

2,297,691.—ELECTROPHOTOGRAPHY. OCT. 6, 1942.
2,357,809.—ELECTROPHOTOGRAPHIC APPARATUS. SEPT. 12, 1944.
3,013,346.—XEROGRAPHIC APPARATUS. DEC. 19, 1961.
3,062,108.—ELECTROPHOTOGRAPHIC COPYING APPARATUS. NOV. 6, 1962.
3,062,109.—XEROGRAPHIC REPRODUCING APPARATUS. NOV. 6, 1962. ARG. 0149705, CAN. 0683779, CHL. 0024545, CLB. 0014851, COS. 0001435, FRA. 1291840, GER. 1290817, GRB. 0995414, GUA. 0001694, HGK. 0022168, ITL. 0646249, JAP. 0444672, KEN. 0167268, PNM. 0002135, PRU. 0008376, URG. 0007955, VZL. 0017266.
3,078,770.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 26, 1963. CAN. 0701741.
3,099,943.—XEROGRAPHIC REPRODUCING APPARATUS. AUG. 6, 1963. ADN. 0000468, ARG. 0169828, ATR. 0251420, AUS. 0270773, BEL. 0629050, BRA. 0082981, BRS. 00J3736, BRU. 0000369, CAN. 0738132, CHL. 0023724, CLB. 0015207, COS. 0001436, ECD. 0000022, FIJ. 0000340, FRA. 1346575, GHA. 0000997, GIB. 1032951, GIE. 0006569, GRB. 1032951, GRK. 0025939, GUA. 0001740, GUR. 1032951, HGK. 0008969, IND. 0086614, ISR. 0018757, ITL. 0752146, JAP. 0491155, JER. 0000P97, KEN. 0001743, LXB. 0043231, MAU. 1897571, MEX. 0074814, MLS. 0014969, NIG. 0001617, NOR. 0124476, NZL. 0134238, PRU. 0008375, PTG. 0040583, SAF. 0063737, SBH. 0005169, SGP. 0008069, SHL. 0000016, SLN. 1677286, SPN. 0286059, SRK. 0000387, STZ. 0425469, SWD. 0323285, UGD. 0000169, URG. 0007713, VZL. 0017049.
3,131,617.—XEROGRAPHIC REPRODUCING APPARATUS. MAY 5, 1964.
3,135,179.—XEROGRAPHIC APPARATUS. JUNE 2, 1964.
3,135,180.—XEROGRAPHIC APPARATUS. JUNE 2, 1964.
3,139,013.—DOCUMENT REPRODUCING APPARATUS. JUNE 30, 1964. CAN. 0727819, FRA. 1346596, GRB. 1016265, JAP. 0442652.
3,146,688.—XEROGRAPHIC MACHINE. SEPT. 1, 1964. ATR. 0249503, AUS. 0272158, BEL. 0616948, CAN. 0712269, FRA. 1324504, GER. 1295372, GRB. 1009867, JAP. 0464921.
3,182,573.—MASKED PLATE XEROGRAPHY. MAY 11, 1965. CAN. 0859657, FRA. 1353685, GRB. 1021882, ITL. 0694073, JAP. 0470242.
3,205,484.—ELECTROSTATIC MEMORY SYSTEM. SEPT. 7, 1965.
3,355,983.—CARD HANDLING MECHANISM. DEC. 5, 1967. CAN. 0814086, MEX. 0113373.
3,514,201.—RECORDING APPARATUS. MAY 26, 1970. CAN. 0880484.
3,520,602.—GRAPHIC DISPLAY DEVICE. JULY 14, 1970. CAN. 0838312.
3,536,395.—TRANSACTION RECORDING APPARATUS AND SYSTEM. OCT. 27, 1970. CAN. 0870184, GRB. 1213825.
3,580,671.—EXPOSURE APPARATUS. MAY 25, 1971. CAN. 0912104, GRB. 1276010.
3,677,633.—PORTABLE DOCUMENT ABSTRACTOR. JULY 18, 1972.
3,770,430.—PHOTOELECTROSCLOGRAPHIC IMAGING PROCESS. NOV. 6, 1973.
3,865,482.—ELECTROSTATOGRAPHIC COPYING MACHINE. FEB. 11, 1975.
3,917,396.—CONTROL SYSTEM. NOV. 4, 1975.
3,955,977.—ELECTROSTATOGRAPHIC PROCESS. MAY 11, 1976.
3,976,374.—ELIMINATION OF REDUNDANT IMAGE. AUG. 24, 1976. GRB. 1419725.
3,977,780.—ELECTROSTATIC REPRODUCTION METHOD AND APPARATUS. AUG. 31, 1976.

Class 1J 2

2,701,764.—ELECTROPHOTOGRAPHIC APPARATUS AND METHODS. FEB. 8, 1955.
2,892,391.—ELECTROPHOTOGRAPHIC CAMERA APPARATUS. JUNE 30, 1959.
3,057,275.—IMAGE KEEPING. OCT. 9, 1962.
3,185,051.—XEROGRAPHIC METHOD. MAY 25, 1965. CAN. 0740113, FRA. 1385444, GRB. 1026557, ITL. 0712017.
3,237,197.—IMAGE METHOD FOR ELECTROSTATIC RETENTION IN PHOTOCONDUCTIVE LAYERS. FEB. 22, 1966.

Class 1J 3

2,878,120.—INTERMITTENT ELECTROPHOTOGRAPHIC RECORDER—HORIZONS. MAR. 17, 1959. CAN. 0614984.
3,105,426.—XEROGRAPHIC APPARATUS. OCT. 1, 1963. CAN. 0689214, FRA. 1290414, GER. 1297476, GRB. 0989487, JAP. 0626117.
3,132,206.—HIGH SPEED PRINTING APPARATUS. MAY 5, 1964. GRB. 0999043.
3,649,114.—MULTIPLE OUTPUT ELECTROSTATIC RECORDING SYSTEM. MAR. 14, 1972. ARG. 0200567, AUS. 0447901, CAN. 0923542, NZL. 0160104.

Class 1J 4

3,148,601.—XEROGRAPHIC REPRODUCING APPARATUS. SEPT. 15, 1964.
3,187,651.—XEROGRAPHIC REPRODUCING APPARATUS. JUNE 8, 1965. FRA. 1338861, GER. 1797533, GRB. 1015633, HGK. 0013368, JAP. 0441423, KEN. 0167368.
3,196,767.—DOCUMENT COPY MECHANISM. JULY 27, 1965. CAN. 0731929, GRB. 1032953, JAP. 0651995.
3,399,610.—XEROGRAPHIC APPARATUS. SEPT. 3, 1968. CAN. 0819923.
3,788,203.—JUSTIFICATION APPARATUS. JAN. 29, 1974. CAN. 0989929, GRB. 1380831.
3,982,831.—ELECTROSTATOGRAPHIC REPRODUCTION APP & DRIVE THEREFOR. SEPT. 28, 1976.
4,002,409.—CHAIN-FEED CONTROL LOGIC FOR A MULTI-MODE COPIER/DUPLICATOR. JAN. 11, 1977. BEL. 0840300.
4,027,963.—MULTI-MODE REPRODUCING APPARATUS. JUNE 7, 1977. BEL. 0843154, HAT. 0001534.

Class 1J 5

2,600,580.—ELECTROPHOTOGRAPHIC APPARATUS. JUNE 17, 1952.
2,647,464.—ELECTROGRAPHY. AUG. 4, 1953.
2,791,949.—XEROGRAPHIC COPYING DEVICE. MAY 14, 1957. CAN. 0577962.
2,878,732.—XEROGRAPHIC COPIER. MAR. 24, 1959. CAN. 0596022.
3,009,402.—XEROGRAPHIC PROCESSING APPARATUS. NOV. 21, 1961.
3,040,621.—XEROGRAPHIC PLATE SUPPORTING APPARATUS. JUNE 26, 1962.
3,083,869.—XEROGRAPHIC PLATE MAGAZINE AND FEEDING APPARATUS. APR. 2, 1963.
3,091,160.—XEROGRAPHIC PLATE FEEDING AND SUPPORTING APPARATUS. MAY 28, 1963.
3,160,057.—XEROGRAPHIC PROCESSING APPARATUS. DEC. 8, 1964.
3,272,101.—XEROGRAPHIC APPARATUS. SEPT. 13, 1966.
3,520,605.—DOCUMENT SCAN DRIVE AND RETURN APPARATUS. JULY 14, 1970. CAN. 0858848.
3,697,160.—CONTINUOUS IMAGING APPARATUS. OCT. 10, 1972.

Class 1J 6

RE.27,776.—ROLLER ASSEMBLY FR BELT-TYPE PHOTORECEPTR IN ELECTROSTATC PRNTNG MACHINES—RE OF D1480—3,536. OCT. 9, 1973.
2,624,652.—GRAPHIC RECORDING. JAN. 6, 1953.
3,190,199.—XEROGRAPHIC COPYING APPARATUS. JUNE 22, 1965. CAN. 0709970, GRB. 1033834, JAP. 0477813.
3,435,693.—BELT TRACKING DEVICE. APR. 1, 1969. ARG. 0168295, ATR. 0283116, AUS. 0421893, BEL. 0705641, CAN. 0853440, CHL. 0023084, CLB. 0017528, DNK. 0117047, FRA. 1543079, GRB. 1180659, ITL. 0827782, MEX. 0100320, NOR. 0124530, PRU. 0009336, SAF. 0676414, SPN. 0346430, STZ. 0471736, URG. 0009729, VZL. 0023676.
3,536,323.—BELT ASSEMBLY—REISSUED D3492—27,776. OCT. 27, 1970. ARG. 0181307, AUS. 0437364, BEL. 0733405, BRA. 6909127, CAN. 0943179, FRA. 6917082, GRB. 1275135, HUN. 0157763, ITL. 0869475, JAP. 0700616, MEX. 0112302, PNM. 0001817, SPN. 0367615, STZ. 0506819, TIW. 0UM5646, USR. 0406385, VZL. 0025831.
3,661,452.—XEROGRAPHIC REPRODUCTION MACHINE. MAY 9, 1972. ARG. 0169621, AUS. 0442749, BEL. 0733407, CAN. 0910959, CHL. 0024800, DNK. 0125257, FRA. 6917084, GRB. 1264406, ITL. 0877771, MEX. 0115542, PNM. 0001759, PRU. 0010640, SPN. 0367613, STZ. 0491418, TIW. 0006498, USR. 0358875, VZL. 0026279.
3,664,204.—BELT ASSEMBLY FOR USE IN AN ELECTROSTATIC PRINTING MACHINE. MAY 23, 1972. ARG. 0193980, BEL. 0777322, CAN. 0939735, FRA. 7147893, GRB. 1372389, ITL. 0944437, MEX. 0128274, VZL. 0032791.
3,730,623.—VACUUM HOLDDOWN DEVICE FOR MOVING BELTS. MAY 1, 1973. ARG. 0191239, BEL. 0777323, CAN. 0940591, FRA. 7147894, GRB. 1372390, ITL. 0944436, MEX. 0127634.
3,765,757.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. OCT. 16, 1973. BEL. 0793551, GRB. 1419978, ITL. 0972846, SPN. 0410107.
3,790,271.—PROCESSING CONTROL SYSTEM FOR PRINTING MACHINES. FEB. 5, 1974. CAN. 0986173, SPN. 0418256.
3,801,092.—VACUUM HOLD-DOWN DEVICE FOR MOVING BELTS. APR. 2, 1974. ARG. 0191239, BEL. 0777323, CAN. 0940591, FRA. 7147894, GRB. 1372390, ITL. 0944436, MEX. 0127634.
3,860,340.—OPTICAL ALIGNMENT ON VACUUM PLENUM. JAN. 14, 1975. BEL. 0784630, FRA. 7220686, GRB. 1379674, ITL. 0956164.
3,867,027.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. FEB. 18, 1975. BEL. 0793551, GRB. 1419978, ITL. 0972846, SPN. 0410107.
3,907,650.—PHOTOSENSITIVE BINDER LAYER FOR XEROGRAPHY. SEPT. 23, 1975.
3,914,126.—NICKEL OXIDE INTERLAYERS FOR PHOTOCONDUCTIVE ELEMENTS. OCT. 21, 1975.
3,921,179.—FLUID PEN ASSEMBLY. NOV. 18, 1975.
3,961,849.—ELECTROSTATIC PRINTING MACHINE. JUNE 8, 1976. ARG. 0200108, ATR. 0323556, AUS. 0458405, BEL. 0776599, CAN. 0948274, FRA. 7145342, GRB. 1374799, ITL. 0943875, MEX. 0127493, PNM. 0718307, SAF. 0718307, SPN. 0397851, STZ. 0554009, SWD. 7115731, VZL. 0032936.

Class 1J 7

3,099,944.—XEROGRAPHIC CONTROL APPARATUS. AUG. 6, 1963. CAN. 0738131, IND. 0096308, JAP. 0491992.
3,512,885.—ACCOUNTING DEVICE FOR XEROGRAPHIC REPRODUCING APPARATUS. MAY 19, 1970. ARG. 0152214, ATR. 0285324, AUS. 0409894, BEL. 0670170, BRA. 0086686, CAN. 0763624, CHL. 0022095, CLB. 0015661, COS. 0001881, DNK. 0125559, ECD. 0000019, EGR. 0050203, EIR. 0029756, ELS. 0000939, FRA. 1459931, GER. 1522804, GRB. 1122622, GRK. 0030861, GUA. 0001741, HOL. 0146300, IND. 0096570, ISR. 0024363, ITL. 0729658, JAP. 0513607, LXB. 0049537, MEX. 0079047, NOR. 0124392, NZL. 0142991, PAK. 0116058, PLP. 0005074, PNM. 0002079, PRU. 0008106, PTG. 0044651, SAF. 0655276, SPN. 0318011, STZ. 0438031, SWD. 0358037, TRK. 0013473, UAR. 0007497, URG. 0006622, VZL. 0023997.
3,588,472.—LOGIC CONTROL APPARATUS. JUNE 28, 1971. ARG. 0181590. ATR. 0279353, BEL. 0706629, BRA. 6793350, CAN. 0834957, FRA. 1567082, GRB. 1204719, ITL. 0815466, JAP. 0645591, LXB. 0054882, MEX. 0101675, VZL. 0023684.
3,734,610.—MICROFICHE VIEWER-COPIER WITH BILLING DATA STORAGE. MAY 22, 1973.
3,813,157.—CONTROL LOGIC FOR TROUBLE DETECTION AND RECOVERY. MAY 28, 1974.

Class 1J 8

3,094,049.—XEROGRAPHIC DEVELOPER MEASURING APPARATUS. JUNE 18, 1963.
3,301,152.—XEROGRAPHIC COPYING APPARATUS. JAN. 31, 1967.
3,348,521.—AUTOMATIC TONER CONTROL SYSTEM. OCT. 24, 1967. CAN. 0799398.
3,453,045.—XEROGRAPHIC DEVELOPMENT APPARATUS. JULY 1, 1969. CAN. 0852125, FRA. 1559973, GRB. 1213493, HUN. 0156188, ITL. 0832847, JAP. 0602169, USR. 0371739.

3,542,466.—DEVELOPMENT APPARATUS. NOV. 24, 1970. AUS. 0428620, BEL. 0725611, CAN. 0884213, FRA. 1598505, GRB. 1203167, ITL. 0870661, JAP. 0641479, SPN. 0361653, SWD. 0343694.
3,695,224.—CASCADE DEVELOPMENT. OCT. 3, 1972.
3,816,756.—AUTOMATIC BIAS CONTROL. JUNE 11, 1974.
3,851,966.—REPRODUCTION APPARATUS. DEC. 3, 1974. BEL. 808482.
3,869,896.—ROLLING PROCESS. MAR. 11, 1975. GRB. 1434131.
3,931,792.—ABRASIVE LIQUID DEVELOPING APPARATUS. JAN. 13, 1976.
3,994,726.—LAMINATED FLEXIBLE PHOTORECEPTOR. GRB. 1429517.
4,002,476.—METHOD OF DEVELOPING RESILIENT PHOTOCONDUCTIVE ELEMENT. JAN. 11,, 1977. GRB. 1429517.
4,023,967.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPMENT METHOD IN WHICH A UNIFORM SUBSTANTIAL INTERFACE CONTACT. BEL. 0819537, GRB. 1429518.

Class 1K

T.940,022.—PRESSURIZED AND FILTERED XEROGRAPHIC SYSTEM. NOV. 4, 1975.
3,638,110.—DEVC FOR MEASRNG CHRG ON MATRIAL BY CONVRTNG INTO ELCTRCL SGNLS FRICTNL FORCS CAUSD BY CHARGE. JAN. 25, 1972. AUS. 0161306, BEL. 0746479, FRA. 7007991, GRB. 1280803, HUN. 0161306, ITL. 0892329, JAP. 0681943, PLD. 0069581, SPN. 0376910, STZ. 0519185, SWD. 0364418, USR. 0412696.
3,661,453.—ELECTROSTATIC LABEL PRINTER. MAY 9, 1972. CAN. 0927471, FRA. 7122950, GRB. 1345800, ITL. 0927543.
3,893,175.—RECORDER FOR MONITORING COPIERS. JULY 1, 1975. GRB. 1427292.
4,007,326.—ELECTRONIC COPY ANALYSIS. FEB. 8, 1977.
4,016,310.—COATR HRDWR & METH FOR OBTNG UNFRM PHROCNDTV LAYR ON A XEROGRAPHIC PHOTORECEPTOR. APR. 5, 1977.
4,023,523.—COATING HARDWARE AND METHOD FOR OBTAINING UNIFORM PHOTOCONDUCTIVE LAYERS ON A XEROGRAPHIC PHOTO. MAY 17, 1977.
4,023,901.—REPRODUCTION MACHINE SERVICE CONTROL. MAY 17, 1977.
4,025,188.—PHOTOACTIVE DEVICE FOR XEROGRAPHY. MAY 24, 1977.
4,026,397.—CONTROL KNOB CLUTCHES WITH LOCK. MAY 31, 1977.

Class 1K 1

3,013,203.—XEROGRAPHIC ELECTROMETER APPARATUS. DEC. 12, 1961.
3,835,380.—ELECTROMETER SYSTEM. SEPT. 10, 1974.
3,852,668.—ELECTROMETER SYSTEM. DEC. 3, 1974.
3,887,845.—COPIER PHOTORECEPTOR CHARGE CONTROL. JUNE 3, 1975. GRB. 1465969.
3,891,316.—MULTI-PROCESS CONTROL SYSTEM FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 24, 1975.
3,898,001.—ELCTROMETR SYSTM FOR NON-CNTCT DETCTN OF ELCTRSTATC CHRGE ON A MVNG ELCTRSTGRPHC IMAGNG SURFACE. AUG. 5, 1975.
3,909,126.—MULTI-PROCESS CONTROL SYSTEM FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. SEPT. 30, 1975.
3,934,141.—APPARATUS FOR AUTOMATICALLY REGULATING THE AMOUNT OF CHARGE APPLIED TO AN INSULATING SURFACE. JAN. 20, 1976.
3,935,531.—ELECTROMETER WITH LOW VOLTAGE INDICATOR. JAN. 27, 1976.
3,935,532.—AUTOMATIC ZEROING ELECTROMETER. JAN. 27, 1976.
3,998,538.—ELECTROMETER APPARATUS FOR REPRODUCTION MACHINES. DEC. 21, 1976.
4,000,944.—PHOTORECEPTOR FOR ELECTROSTATIC REPRODUCTION MACHINES WITH BUILT IN ELECTRODE. JAN. 4, 1977.
4,003,650.—CONTROLLER FOR REPRODUCTION APPARATUS. JAN. 18, 1977.

Class 1K 2

2,588,675.—ELECTROCOPY APPARATUS. MAR. 11, 1952. CAN. 0489580, FRA. 1017568, GRB. 0695450.
2,917,385.—REFLEX XEROGRAPHY. DEC. 15, 1959. CAN. 0577137.
3,335,003.—REFLEX XEROGRAPHIC PROCESS. AUG. 8, 1967. CAN. 0764912, FRA. 1415836, GER. 1261398, GRB. 1059657, ITL. 0741353, JAP. 0511404.
3,337,339.—SCREEN XEROGRAPHY. AUG. 22, 1967. AUS. 0291558, BEL. 0638029, CAN. 0729824, DNK. 0114045, FRA. 1404424, GER. 0114045, GRB. 1027354, HOL. 0130250, ITL. 0706191, JAP. 0489562, LXB. 0044538, NOR. 0109228, SWD. 0321859.
3,676,118.—REFLEX XEROGRAPHY IMAGING SYSTEM. JULY 11, 1972.

Class 1K 3

3,926,626.—CIRCULATION IMAGING METHOD. DEC. 16, 1975.

Class 2A

2,666,144.—ELECTRORADIOGRAPHY. JAN. 12, 1954. AUS. 0160250, CAN. 0513474, FRA. 1043156, GRB. 0721944, ITL. 0477981, SAF. 0012711, STZ. 0300623, SWD. 0149520.
2,863,767.—XEROGRAPHIC METHOD. DEC. 9, 1958. CAN. 0580777, FRA. 1147979, GER. 1029673, GRB. 0804695.
3,856,461.—REPRODUCTION MACHINE FUSER. DEC. 24, 1974.
3,856,462.—REPRODUCTION MACHINE FUSER. DEC. 24, 1974. BEL. 0821050.
3,877,936.—PHOTOCONDUCTIVE COPOLYMER OF N-VINYLCARBAZOLF AND N-VINYLPHTHALIMIDE. APR. 15, 1975. BEL. 0812436.
3,883,921.—CLEANING ROLL APPARATUS HAVING REJUVENATED CLEANING SURFACE. MAY 20, 1975.
3,944,358.—COLOR IMAGE REPRODUCTION SYSTEMS. MAR. 16, 1976.
3,951,533.—COLOR IMAGE REPRODUCTION SYSTEM. APR. 20, 1976.
3,984,183.—SHEET STRIPPING FROM IMAGING SURFACE. OCT. 5, 1976. BEL. 0836791.
3,997,243.—COLOR IMAGE REPRODUCTION SYSTEM. DEC. 14, 1976.
4,004,549.—ROLL FUSER. JAN. 25, 1977.
4,022,956.—POLYMERS OF BENZANTHRACENE AS ACTIVE MATRIX MATERIALS. MAY 10, 1977.
4,027,138.—A FUSER RELEASE MATERIAL DISPENSER. MAY 31, 1977.
4,035,140.—FIXING DEVICE IN AN ELECTROPHOTOGRAPHIC COPYING MACHINE. JULY 12, 1977.

Class 2A 1

3,764,315.—AMBIPOLAR ELECTROPHOTOGRAPHIC PLATE. OCT. 9, 1973. BEL. 0802608, GRB. 1421948.
3,948,656.—IMPROVED METHOD FOR THE PREPARATION OF CDSSE. APR. 6, 1976.

Class 2A 1A

2,657,152.—PROCESS OF PRODUCING AN ELECTROPHOTOGRAPHIC PLATE. OCT. 27, 1953. AUS. 0152887, CAN. 0516075, FRA. 1039677, GER. 0893010, GRB. 0687704, HOL. 0082956, SAF. 0012307, STZ. 0296692, SWD. 0148967.
2,663,636.—ELECTROPHOTOGRAPHIC PLATE AND METHOD OF PRODUCING SAME. DEC. 22, 1953. CAN. 0512461, GER. 0872427, GRB. 0693112, HOL. 0095533, SAF. 0012644, STZ. 0290324, SWD. 0148966.
2,753,278.—METHOD FOR THE PRODUCTION OF A XEROGRAPHIC PLATE. JULY 3, 1956. CAN. 0543309.
2,862,817.—CRYSTALLINE SELENIUM PLATE. DEC. 2, 1958.
2,919,119.—XEROGRAPHIC PLATE CONDITIONING APPARATUS. DEC. 29, 1959. CAN. 0616780.
2,970,906.—XEROGRAPHIC PLATE AND A PROCESS OF COPY MAKING. FEB. 7, 1961. CAN. 0576158.
3,011,474.—XEROGRAPHIC DEVELOPMENT ELECTRODE APPARATUS. DEC. 5, 1961. CAN. 0701149, GRB. 0948138.
3,077,386.—PROCESS FOR TREATING SELENIUM. FEB. 12, 1963. CAN. 0705359.
3,170,790.—RED SENSITIVE XEROGRAPHIC PLATE AND PROCESS THEREFOR. FEB. 23, 1965.
3,174,855.—METHOD FOR A PRODUCTION OF A XEROGRAPHIC PLATE. MAR. 23, 1965.
3,234,020.—PLATE FOR ELECTROSTATIC ELECTROPHOTOGRAPHY. FEB. 8, 1966.
3,460,296.—METAL WORKING. AUG. 12, 1969. BEL. 0705574, CAN. 0853918, GRB. 1196684.
3,488,896.—PROCESS OF PUMICING A SURFACE. JAN. 13, 1970.

3,489,560.—PHOTOCONDUCTIVE LAYR COMPRISN SELENIUM COMPOUND AND SOLID HYDROPHOBIC METL SALT OF A FATTY ACID. JAN. 13, 1970. BEL. 0711297, CAN. 0871632, FRA. 1544448, GRB. 1203237.

3,517,995.—METHOD & APPARATUS FOR INCREASING THE EFFICIENCY OF CORONA CHARGNG. JUNE 30, 1970. ARG. 0172471, BEL. 0721553, CAN. 0856714, FRA. 1585283, GRB. 1247034, ITL. 0844214, JAP. 0708414, MEX. 0103113, VZL. 0023701.

3,552,848.—XEROGRAPHIC PLATE. JAN. 5, 1971.

3,621,248.—METHOD USING XERORADIOGRAPHIC PLATE INSENSITIVE TO VISIBLE LIGHT. NOV. 16, 1971.

3,954,464.—METHOD OF FABRICATING A COMPOSITE TRIGONAL SELENIUM PHOTORECEPTOR. MAY 4, 1976.

3,961,953.—METHOD OF FABRICATING COMPOSITES TRIGONAL SELENIUM PHOTORECEPTORS. JUNE 8, 1976.

4,007,255.—PREPARATION OF RED AMORPHOUS SELENIUM. FEB. 8, 1977.

4,009,249.—PREPARATION OF RED AMORPHOUS SELENIUM. FEB. 22, 1977.

4,019,014.—METHOD FOR HEAT WELDING SELENIUM. APR. 19, 1977.

Class 2A 1B

2,822,300.—PHOTOCONDUCTIVE MATERIAL HORIZONS. FEB. 4, 1958. CAN. 0665880.

3,312,548.—XEROGRAPHIC PLATES. APR. 4, 1967. BEL. 0691217, CAN. 0819658, FRA. 1505803, GRB. 1165579, JAP. 0650232.

3,467,548.—METHOD OF MAKING XEROGRAPHIC PLATE BY VACUUM EVAPORATION OF SELENIUM ALLOY. SEPT. 16, 1969.

3,490,903.—ALLOYS OF ANTIMONY AND SELENIUM USED IN PHOTOCONDUCTIVE ELEMENTS. JAN. 20, 1970. AUS. 0412949, CAN. 0871074, FRA. 1533536, GRB. 1185389, ITL. 0805955, JAP. 0626127, SWD. 0318193.

3,511,649.—PROCESS OF REDUCING FATIGUE IN PHOTOCONDUCTIVE GLASSES. MAY 12, 1970. GRB. 1193472, JAP. 0604152.

3,524,745.—PHOTOCONDUCTIVE ALLOY OF ARSENIC ANTIMONY AND SELENIUM. AUG. 18, 1970. ARG. 0164055, AUS. 0410443, BEL. 0709132, CAN. 0884810, CHL. 0024255, FRA. 1550902, GRB. 1209971, IND. 0113988, ITL. 0833508, JAP. 9124370, LXB. 0055231, MEX. 0108993, NOR. 0127943, NZL. 0151243, PRU. 0009904, PTG. 0048919, SAF. 0680228, SPN. 0349235, STZ. 0495573, SWD. 0328189, URG. 0009683.

3,615,413.—INDIUM DOPING OF A SE-AS PHOTOCONDUCTIVE ALLOYS. OCT. 26, 1971. CAN. 0917981, GRB. 1309312, JAP. 0739528.

3,655,377.—TRI-LAYERED SELENIUM DOPED PHOTORECEPTOR. APR. 11, 1972.

3,660,086.—ELCTRPHTGRPC PLATE AND PROCS EMPLYNG INORGNC PHOTCNDCTV MATRL W/PHOTOCHROMIC SENSITIVE AGENT. MAY 2, 1972.

3,685,989.—AMBIPOLAR PHOTORECEPTOR AND METHOD OF IMAGING. AUG. 22, 1972. CAN. 0971800, GRB. 1360078.

3,697,265.—VTRS SELNUM ALLY MTRX CNTNING ISLTD PRTCLS/PRTCL NETWKS OF RSN. OCT. 10, 1972. ARG. 0183560, ATR. 0299699, AUS. 0449439, BEL. 0752439, CAN. 0933014, EGR. 0090944, FRA. 7023472, GRB. 1319341, ITL. 0894623, MEX. 0116409, PNM. 0002539, SPN. 0409740, STZ. 0000000, SWD. 7216008, TIW. 0006838, USR. 0374867, VZL. 0031909.

3,879,199.—SURFACE TREATMENT OF ARSENIC-SELENIUM PHOTOCONDUCTORS. APR. 22, 1975.

3,884,688.—PHOTOSENSITIVE ELEMENT EMPLOYING A VITREOUS BISMUTH-SELENIUM FILM. MAY 20, 1975.

3,887,368.—COMPOSITION. JUNE 3, 1975.

3,898,083.—HIGH SENSITIVITY VISIBLE INFRARED PHOTOCONDUCTOR. AUG. 5, 1975.

3,909,458.—PHOTOSENSITIVE VITREOUS LAYER COMPRISING BISMUTH AND SELENIUM. SEPT. 30, 1975.

4,015,029.—SELENIUM & SELENIUM ALLOY EVAPORATION TECHNIQUE. MAR. 29, 1977.

Class 2A 1C

2,844,493.—HIGH RESISTANCE PHOTOCONDUCTOR HORIZONS. JULY 22, 1958.

2,844,543.—TRANSPARENT PHOTOCONDUCTIVE COMPOSITION - HORIZONS. MAR. 18, 1955.

2,863,768.—XEROGRAPHIC PLATE. DEC. 9, 1958.

2,901,349.—XEROGRAPHIC PLATE - SELENIUM PLATE WITH ARSENIC TRISULFIDE INTERFACE. AUG. 25, 1959.

3,140,174.—PROCESS FOR OVERCOATING A XEROGRAPHIC PLATE. JULY. 7, 1964. FRA. 1260498, GRB. 0960871.

3,379,527.—PHOTOCONDUCTIVE INSULATORS COMPRISING ACTIVATED SULFIDES SELENIDES AND SULFOSELENIDES OF CADMIUM. APR. 23, 1968. CAN. 0907921, GRB. 1079065.

3,682,631.—METHOD OF FORMING AN ELECTROPHOTOGRAPHIC LAYER CONTAINING A BENZOQUANAMINE RESIN BINDER. AUG. 8, 1972.

3,867,145.—METHANOL AND HEAT TREATED ZINC OXIDE. FEB. 18, 1975.

3,971,742.—ORGANO-CHALCOGEN COMPOSITIONS. JULY 27, 1976.

Class 2A 1D

3,469,978.—PHOTOSENSITIVE ELEMENT. SEPT. 30, 1969. CAN. 0872173, GRB. 1171909, JAP. 0552967.

3,522,040.—PHOTOSENSITIVE INSULATING MATERIAL. JULY 28, 1970. CAN. 0884808, GRB. 1171910, JAP. 0552966.

3,627,573.—COMPOSITION AND METHOD. DEC. 14, 1971. ARG. 0176480, AUS. 0441224, BEL. 0721965. CAN. 0892493, FRA. 0095985, GRB. 1251630, ITL. 0889828, MEX. 0124897, SPN. 0358960, STZ. 0517359, VZL. 0030358.

Class 2A 1E

2,277,013.—ELECTRIC RECORDING AND TRANSMISSION OF PICTURES. MAR. 17, 1942.

2,662,832.—PROCESS OF PRODUCING AN ELECTROPHOTOGRAPHIC PLATE. DEC. 15, 1953.

2,803,541.—XEROGRAPHIC PLATE. AUG. 20, 1957. CAN. 0563401, FRA. 1105562, GER. 0941767, GRB. 0755683.

2,962,376.—XEROGRAPHIC MEMBER. NOV. 29, 1960.

3,238,150.—PHOTOCONDUCTIVE CADMIUM SULFIDE POWDER AND METHOD FOR THE PREPARATION THEREOF. MAR. 1, 1966. CAN. 0712516, GRB. 1062022, JAP. 0486530.

3,879,200.—NOVEL XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING BIX-BENZIMIDAZOLE PIGMENTS. APR. 22, 1975. ARG. 0188392, AUS. 0465970, BEL. 0763545, BRA. 0088118, CAN. 0928125, CHL. 0027130, EGR. 0093279, FRA. 7107565, GRB. 1337222, ITL. 0919105, MEX. 0122169, PNM. 0002460, SAF. 0711225, SPN. 0388590, TIW. 0008178, USR. 0449515.

3,909,261.—XEROGRAPHIC IMAGING MEMBER HAVING PHOTOCONDUCTIVE MATERIAL IN INTERLOCKING CONTINUOUS PATHS. SEPT. 30, 1975. ARG. 0186443, ATR. 0451252, BEL. 0763544, CAN. 0925741, CHL. 0026794, FRA. 7107567, GRB. 1296291, ITL. 0918909, MEX. 0122096, NZL. 0162891, PLP. 0009378, PNM. 0002396, SAF. 0711227, SPN. 0388639, STZ. 0568591, SWD. 0367259, TIW. 0007844, USR. 0398062.

Class 2A 1E 1

2,937,944.—XEROGRAPHIC LIGHT-SENSITIVE MEMBER AND PROCESS THEREFOR. MAY 24, 1960. AUS. 0242066, BEL. 0586070, CAN. 0610194, FRA. 1243723, GER. 1165408, GRB. 0894371, ITL. 0620746, JAP. 0318674, STZ. 0394806.

3,077,398.—XEROGRAPHIC PLATE MADE BY CAST COATING. FEB. 12, 1963.

Class 2A 1E 2

3,008,825.—XEROGRAPHIC LIGHT-SENSITIVE MEMBER AND PROCESS THEREFOR. NOV. 14, 1961. CAN. 0610195.

Class 2A 1F

3,394,001.—ELECTROPHOTOGRAPHIC SENSITIVE MATERIAL CONTAINING ELECTRON-DONOR DYE LAYERS. JULY 23, 1968. GRB. 1106562.

3,498,835.—METHOD FOR MAKING XEROGRAPHIC PLATES. MAR. 3, 1970. ARG. 0154134, AUS. 0418468, BEL. 0700454, CAN. 0872174, FRA. 1529285, GRB. 1189504, ITL. 0807717, JAP. 0567234, MEX. 0096199, SPN. 0342303, STZ. 0479093, SWD. 0332346, VZL. 0024014.

3,532,496.—XRGRPHC PLTS AND PROCS EMPLYNG HMGNUS DISPRSNS OF VTREOUS SLNIUM AND SNSTZNG DYES AS PHTCNDCTV LAYER. OCT. 6, 1970.

Class 2A 1G

3,288,603.—METHOD OF RESTORING XEROGRAPHIC PROPERTIES TO A GLASS BINDER PLATE. NOV. 29, 1966. CAN. 0800955, FRA. 1432127, GER. 1497201, GRB. 1088473, ITL. 0802168, JAP. 0519677.

3,397,982.—XIC PLATE W/INORGANIC GLASS BINDER HAVING OVERCOATING CONSISTING ESSENTIALLY OF ALUMINUM OXIDE. AUG. 20, 1968. ARG. 0150690, AUS. 0407349, BEL. 0674140, CAN. 0866142, FRA. 1460232, GER. 1497230, GRB. 1129674, ITL. 0822914, JAP. 0531894, MEX. 0085270, SWD. 0319976.

3,451,846.—PROCESS OF MAKING XEROGRAPHIC PLATE. JUNE 24, 1969. CAN. 0818384, GRB. 1183961, JAP. 0598621.

3,510,298.—PROCESS OF ACTIVATING PHOTOCONDUCTIVE MATERIAL IN GLASS BINDER. MAY 5, 1970. CAN. 0834668, GER. 1572366, GRB. 1189822, JAP. 0552968.

3,537,848.—PROCESS OF TREATING A XEROGRAPHIC GLASS BINDER PLATE AND PRODUCT. NOV. 3, 1970. ARG. 0180580.

3,655,376.—ELECTROPHOTOGRAPHIC DENITRIFIED GLASS BINDER PLATE. APR. 11, 1972.

3,885,962.—PHOTOGRAPHIC AND ELECTROPHOTOGRAPHIC MEMBERS WITH GLASS FIBER CONTAINING PAPER SUBSTRATES. MAY 27, 1975.

Class 2A 2

3,657,272.—PROCESS FOR PREPARING X-FORM METAL FREE PHTHALOCYANINE. APR. 18, 1972.

3,738,831.—CHALCOGEN ORGANIC COMPOUNDS USED IN ELECTROPHOTOGRAPHIC PLATES AND PROCESS. JUNE 12, 1973.

3,758,301.—ELECTROPHOTOGRAPHIC USE OF SELENIUM CONTAINING POLYMERS. SEPT. 11, 1973.

3,770,428.—ORGANIC PHOTOCONDUCTIVE MATERIAL. NOV. 6, 1973.

3,864,144.—PROCESS FOR PREPARATION OF PHOTOCONDUCTIVE FILMS FROM INTRACTABLE MATERIALS. FEB. 4, 1975. GRB. 1414158, TIW. 0008534.

3,870,516.—METHOD OF IMAGING PHOTOCONDUCTOR IN CHARGE TRANSPORT BINDER. MAR. 11, 1975. AUS. 0466028, BEL. 0763541, CAN. 0931413, CHL. 0026797, EGR. 0094762, FRA. 7107559, GRB. 1343671, ITL. 0919108, MEX. 0122098, NZL. 0162883, PNM. 0002450, SAF. 0711219, SPN. 0388584, STZ. 0567744.

3,877,936.—PHOTOCONDUCTIVE COPOLYMER OF N-VINYLCARBAZOLE AND N-VINYLPHTHALIMIDE. APR. 15, 1975. BEL. 0812436.

3,879,198.—ELECTROPHOTOGRAPHIC AMBIPOLAR PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHOD. APR. 22, 1975.

3,882,087.—ORGANIC PHOTOCONDUCTIVE MATERIAL. MAY 6, 1975.

3,903,107.—DIRECT ALPHA TO X PHASE CONVERSION OF METAL CONTAINING PHTHALOCYANINE. SEPT. 2, 1975. BEL. 0815632, SAF. 0743536.

3,915,702.—PHTOELCTRC & ELCTRPHTGRPHC PGMNTS COMPRISING DERIVATIVES OF CONDENSED PLYCYLC ARMATC HYDRCABN A. OCT. 28, 1975.

3,915,704.—PHOTOINDUCED ACID CATALYZED DEGRADATION OF DEGRADABLE POLYMERS. OCT. 28, 1975.

3,917,483.—PHOTOINDUCED ACID CATALTZED DEPOLYMERIZATION OF DEGRADABLE POLYMERS. NOV. 4, 1975.

3,923,762.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND P. DEC. 2, 1975. BEL. 0822305, STZ. 0032598.

3,926,629.—ELECTROPHOTOGRAPHIC METHOD AND PLATE EMPLOYING A PHTHALOCYANINE POLYMER. DEC. 16, 1975.

3,932,180.—DIRECT ALPHA TO X PHASE CONVERSION OF METAL-FREE PHTHALOCYANINE. JAN. 13, 1976. BEL. 0815632, SAF. 0743536.

3,943,108.—PHOTOCONDUCTIVE COMPOSITION OF AN ALDEHYDE CONDENSATE. MAR. 9, 1976.

3,954,906.—AMBIPOLAR PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHOD. MAY 4, 1976.

3,970,602.—COPOLYMERS OF N-VINYLCARBAZOLE AND N-VINYLPHTHALIMIDE AND DERIVATIVES THEREOF. JULY 20, 1976. BEL. 0812436.

3,978,029.—PHOTOCONDUCTIVE COMPOSITIONS AND IMAGING MEMBERS AND METHODS EMPLOYING SAME. AUG. 31, 1976. ARG. 0206212, BEL. 0816552, FRA. 7422479, SAF. 0744129.

3,981,848.—PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHODS EMPLOYING SAME. SEPT. 21, 1976. ARG. 0206211, ATR. 0332734, FRA. 7422484.

Class 2A 2A

3,408,181.—HEAT DEFORMABLE RECORDING MATERIALS CONTAINING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMPLE. OCT. 29, 1968. CAN. 0843620, FRA. 1463744, GER. 1522677, GRB. 1138552, ITL. 0755286, MEX. 0109927.

3,432,415.—ELECTROPHORETIC IMG. PROCESS USING PHOTOSENSITIVE XANTHENONIUM SALTS. MAR. 11, 1969. AUS. 0439502, BEL. 0743895, CAN. 0851118, GER. 1522701, GRB. 1155747, JAP. 0650631, MEX. 0104632.

3,445,227.—ELECTROPHOTOGRAPHIC IMAGING PROCESSES EMPLOYING 2,4 DIAMINOTRIAZINES AS ELCTRCLY PHOTOSNSTV PRT. MAY 20, 1969. BEL. 0743891, CAN. 0852681, GER. 1522687, GRB. 1146019, JAP. 0617789.

3,447,922.—ELECTRICALLY PHOTOSENSITIVE PARTICLES USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROC. JUNE 3, 1969.

3,448,029.—ELECTROPHORETIC IMAGING PROCESS USING 8,13-DIOXODINAPTHO-2,1-B,2,3-D-FURAN-6-CARBOXAMIDE PIGMEN. JUNE 3, 1969.

3,448,030.—ELECTRICALLY PHOTOSENSITIVE PART. USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROCESSE. JUNE 3, 1969. BEL. 0743893, CAN. 0943830, GRB. 1155554, JAP. 0686735.

3,482,970.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS USING NAPHTHYLAZO COMPOUNDS AS THE PRIMARY PHOTOCONDUCTOR. DEC. 9, 1969. AUS. 0453397, BEL. 0742978, CAN. 0869486, GRB. 1296390, ITL. 0878843, JAP. 0725059.

3,553,009.—PROCESS OF PREPARING AN ELECTROPHOTOGRAPHIC MATERIAL. JAN. 5, 1971.

3,594,163.—METHOD OF CONVERTING ALPHA PHTHALOCYANINE TO THE X FORM. JULY 20, 1971.

3,640,710.—PHTHALOCYANINE PHOTOCONDUCTIVE ELEMENTS CONTAINING MULTIPLE BINDER MATERIALS. FEB. 8, 1972. ARG. 0184666, ATR. 0328861, AUS. 0456430, BEL. 0760751, CAN. 0933012, FRA. 7047636, GRB. 1333605, ITL. 0913999, PNM. 0002243, STZ. 0554550, SWD. 0365878, TIW. 0006738, USR. 0450420, VZL. 0032928.

3,667,943.—QUINACRIDONE PIGMENTS IN ELECTROPHOTOGRAPHIC IMAGING. JUNE 6, 1972. ARG. 0184823, AUS. 0452663, BEL. 0737810, CAN. 0877882, EGR. 0077411, FRA. 6928700, GRB. 1278702, ITL. 0888005, SPN. 0370720, STZ. 0519183, SWD. 0346396, TIW. 0005517, USR. 0351396.

3,667,944.—QUINACRIDONE PIGMENTS IN ELECTROPHOTOGRAPHIC RECORDING. JUNE 6, 1972. ARG. 0177369, AUS. 0452031, BEL. 0741159, CAN. 0884807, FRA. 6937223, GRB. 1286079, ITL. 0879710, JAP. 0693421, MEX. 0115407.

3,667,945.—QUINACRIDONE PIGMENTS IN ELECTROPHOTOGRAPHIC IMAGING. JUNE 6, 1972.

3,708,292.—PI-FORM METAL PHTHALOCYANINE. JAN. 2, 1973. ARG. 0194234, BEL. 0783793, GRB. 1396922, ITL. 0955644, MEX. 0128928.

3,708,293.—PI-FORM METAL-FREE PHTHALOCYANINE. JAN. 2, 1973. ARG. 0195167, BEL. 0783792, GRB. 1395769, ITL. 0955643, MEX. 0131970.

3,761,261.—PHTHALOCYANINE DYE SENSITIZERS FOR ZINC OXIDE. SEPT. 25, 1973.

3,816,118.—ELECTROPHOTOGRAPHIC ELEMENT CONTAINING PHTHALOCYANINE. JUNE 11, 1974. ARG. 0156316, CAN. 0890855, FRA. 0091579, GRB. 1175451, ITL. 0809972, MEX. 0115884, VZL. 0024012.

3,850,630.—XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING INDIGOLD PIGMENTS. NOV. 26, 1974. ARG. 0188393, AUS. 0465971, BEL. 0763391, CAN. 0932198, CHL. 0027129, EGR. 0093923, FRA. 7107566, GRB. 1337221, ITL. 0919106, MEX. 0122099, NZL. 0162890, PNM. 0002480, SAF. 0711226, SPN. 0388591, TIW. 0006740, USR. 0463276.

3,865,798.—PHOTOACTIVE POLYMERS INDUCED EXOCYCLIC QUARTET CONCEPT. FEB. 11, 1975. AUS. 0462805, BEL. 0790689, FRA. 7237458, GRB. 1411998, ITL. 0969902, MEX. 0133728, SPN. 0407984, STZ. 0028515.

3,877,935.—NOVEL XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING POLYNUCLEAR QUINONE PIGMENTS. APR. 15, 1975. ARG. 0002614, AUS. 0452620, BEL. 0763389, CAN. 0932197, CHL. 0027120, FRA. 7107563, GRB. 1337224, GUA. 0002614, ITL. 0919103, MEX. 0122100, NZL. 0162887, PNM. 0002467, SAF. 0711223, SPN. 0388588, TIW. 0006741.

3,884,689.—POLYCYCLIC AROMATIC POLYMER AS A PHOTO-CONDUCTOR OR OVERLAYER. MAY 20, 1975.

3,895,945.—PROCESS FOR PREPARATION OF A DYESTUFF SENSITIZED PHOTOCONDUCTIVE COMPOSITION. JULY 22, 1975.

3,899,328.—ACTIVE MATRIX AND INTRINSIC PHOTOCONDUCTIVE POLYMER OF A LINEAR POLYSILOXANE. AUG. 12, 1975.

3,899,329.—MIXTURE OF PHOTOCONDUCTORS IN AN ACTIVE MATRIX. AUG. 12, 1975. ARG. 0187047, ATR. 327000, AUS. 0450862, BEL. 0775968, CAN. 0971797, CHL. 0027272, FRA. 7143179, GRB. 1348138, GUA. 0002724, ITL. 0941822, MEX. 1328040, PNM. 0002602, SAF. 0718022, SPN. 397403, STZ. 0026771.

3,904,407.—XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING PERYLENE PIGMENTS. SEPT. 9, 1975. ARG. 0189747, AUS. 0465811, BEL. 0763388, CAN. 0933010, CHL. 0026796, EGR. 0093458, FRA. 7107562, GRB. 1337225, GUA. 0002799, ITL. 0919102, MEX. 0126620, PNM. 0002468, SAF. 0711222, SPN. 0388587, SWD. 0362509, TIW. 0007210, USR. 0473381.

3,923,762.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND P. DEC. 2, 1975. BEL. 0822305, STZ. 0032598.

3,927,026.—PROCESS OF MAKING X-FORM METAL PHTHALOCYANINE. DEC. 16, 1975. CAN. 0916703, GRB. 1312946, JAP. 0693981.

3,932,454.—PROCESS OF MAKING HEXAGONAL ALPHA METAL-FREE PHTHALOCYANINE. JAN. 13, 1976. CAN. 0918152, GRB. 1327084, JAP. 0752724.

3,941,085.—RELEASE MATERIAL APPLICATOR. MAR. 2, 1976.

Class 2A 2a

3,941,750.—POLYVINYL PYREMAL-AN INTRINSIC PHOTOCONDUCTOR AND ACTIVE MATRIX POLYMER. MAR. 2, 1976.

3,951,654.—MTHD ENHNCMT RATE AND EFFICIENCY OF PHOTODSCHG OF ELCTRPHGRIC IMAGING MEMBERS COMPRSNG PHTHALOCYA. APR. 20, 1976.

4,006,017.—PHOTOCONDUCTIVE COMPOSITION ARTICLE & PROESS. FEB. 1, 1977.

4,031,109.—METHOD FOR THE PREPARATION OF X-FORM METAL PHTHALOCYANINE AND X-FORM METAL FREE COMPOUNDS. JUNE 21, 1977. ARG. 0188048.

Class 2A 2B

3,408,182.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMP. OCT. 29, 1968. CAN. 0847805, FRA. 1463743, GRB. 1137665, ITL. 0755290, JAP. 0572185, MEX. 0107318.

3,408,183.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMP. OCT. 29, 1968. CAN. 0819066, FRA. 1463745, GER. 1522676, GRB. 1126048, ITL. 0755287, JAP. 0727091, MEX. 0106758.

3,408,184.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRNSFR COMPLE. OCT. 29, 1968. CAN. 0818382, FRA. 1463727, GRB. 1137664, ITL. 0755289, JAP. 0726382, MEX. 0105835.

3,408,185.—ELECTROPHOTOGRAPHIC MATERIALS AND METHOD EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMP. OCT. 29, 1968. CAN. 0848383, FRA. 1463728, GER. 1645192, GRB. 1137476, ITL. 0755291, MEX. 0106763.

3,408,186.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRNSFR COMPLE. OCT. 29, 1968. CAN. 0846736, FRA. 1463746, GRB. 1138629, ITL. 0755288, JAP. 0569483, MEX. 0106589.

3,408,187.—ELECTROPHOTOGRAPHIC MATER AND METH EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMPLEXES. OCT. 29, 1968. CAN. 0867298, GER. 1522721, GRB. 1163097, JAP. 0797719.

3,408,188.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS COMPRISING PHOTOCONDUCTIVE CHARGE TRANSFER COMPLEXES. OCT. 29, 1968. CAN. 0869485, GRB. 1183516, JAP. 0797720.

3,408,189.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS EMPLOYING PHOTOCONDUCTIVE CHARGE TRANSFER COMPLEXES. OCT. 29, 1968.

3,408,190.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS EMPLOYING PHOTOCONDUCTIVE CHARGE TRANSFER COMPLEXES. OCT. 29, 1968. CAN. 0850019, GER. 1302772, GRB. 1182172.

3,879,201.—PERSISTENT PHOTOCONDUCTIVE COMPOSITIONS. APR. 22, 1975.

3,896,184.—POLYMERS OF BENZANTHRACENE AS ACTIVE MATRIX MATERIALS. JULY 22, 1975.

3,923,762.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND P. DEC. 2, 1975. BEL. 0822305, STZ. 0032598.

4,033,769.—PERSISTENT PHOTOCONDUCTIVE COMPOSITIONS. JULY 5, 1977.

Class 2A 2C

4,019,902.—PHOTORECEPTOR FABRICATION. APR. 26, 1977.

Class 2B

2,666,144.—ELECTRORADIOGRAPHY. JAN. 12, 1954. AUS. 0160250, CAN. 0513474, FRA. 1043156, GRB. 0721944, ITL. 0477981, SAF. 0012711, STZ. 0300623, SWD. 0149520.

3,617,265.—METHOD FOR PREPARING A RESIN OVERCOATED ELECTROPHOTOGRAPHIC PLATE. NOV. 2, 1971.

3,635,705.—MULTI-LAYERED HALOGEN-DOPED SELENIUM PHOTOCONDUCTIVE ELEMENT. JAN. 18, 1972. GRB. 1311329, ITL. 0901916, JAP. 0739531.

3,639,120.—2-LAYERED PHOTOCONDUCTIVE ELEMNT CONTNG A HALOGEN DOPED STORG LAYER AND SELENIUM ALLOY CNTRL LAYER. FEB. 1, 1972. CAN. 0870535, GRB. 1193876, JAP. 0558440.

3,655,377.—TRI-LAYERED SELENIUM DOPED PHOTORECEPTOR. APR. 11, 1972.

3,712,810.—AMBIPOLAR PHOTORECEPTOR AND METHOD. JAN. 23, 1973. CAN. 0971025, GRB. 1363266.

3,843,407.—BLADE CLEANING WITH REVERSE MOVEMENT. OCT. 22, 1974.

3,848,994.—LINE CHARGE TONER CLEANING. NOV. 19, 1974.

3,928,034.—ELECTRON TRANSPORT LAYER OVER AN INORGANIC PHOTOCONDUCTIVE LAYER. DEC. 23, 1975. AUS. 0453265, BEL. 0763542, CAN. 0932199, CHL. 0026802, EGR. 0093924, FRA. 7107560, GRB. 1337227, GUA. 0002423, ITL. 0919109, MEX. 0121682, NZL. 0162884, PNM. 0002473, SAF. 0711220, SPN. 0388585, STZ. 0576659, SWD. 0363176, TIW.00 07181.

3,953,207.—A COMPOSITE LAYERED PHOTORECEPTOR. APR. 27, 1976.

4,007,043.—PHOTOCONDUCTIVE ELEMENTS WITH COPOLYMER CHARGE TRANSPORT LAYERS. FEB. 8, 1977.

4,007,100.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. FEB. 8, 1977.

4,007,101.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. FEB. 8, 1977.

4,012,251.—MULTI-LAYERED PHOTOCONDUCTIVE MEMBER. MAR. 15, 1977.

4,013,528.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATRIALS. MAR. 22, 1977.

4,013,529.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. MAR. 22, 1977.

4,013,530.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. MAR. 22, 1977.

4,013,623.—INTRACHAIN CHARGE TRANSFER COMPLEXES. MAR. 22, 1977.

4,014,768.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. MAR. 29, 1977.

4,016,058.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. APR. 5, 1977.

4,018,602.—METHOD FOR IN-SITU FABRICATION OF PHOTOCONDUCTIVE COMPOSITE. APR. 19, 1977.

4,022,956.—POLYMERS OF BENZANTHRACENE AS ACTIVE MATRIX MATERIALS. MAY 10, 1977.

4,023,969.—DEFORMABLE ELASTOMER IMAGING MEMBER EMPLOYING AN INTERNAL OPAQUE DEFORMABLE METALLIC LAYER. MAY 17, 1977.

4,025,710.—INTRACHAIN CHARGE TRANSFER COMPLEXES. MAY 24, 1977.

4,028,203.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 7, 1977.
4,030,991.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 21, 1977.
4,030,992.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 21, 1977.
4,030,993.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 21, 1977.

Class 2B 1

2,901,348.—RADIATION SENSITIVE PHOTOCONDUCTIVE MEMBER. AUG. 25, 1959. CAN. 0575600, FRA. 1099631, GER. 1032669, GRB. 0789802.
2,917,385.—REFLEX XEROGRAPHY. DEC. 15, 1959. CAN. 0577137.
3,041,166.—XEROGRAPHIC PLATE AND METHOD. JUNE 26, 1962. CAN. 0617821, GRB. 0936649.
3,243,293.—PLATE FOR ELECTROSTATIC ELECTROPHOTOGRAPHY. MAR. 29, 1966. CAN. 0830430.
3,288,602.—XEROGRAPHIC PLATE AND METHOD. NOV. 29, 1966. CAN. 0795978, GER. 1237902, GRB. 1029181, ITL. 0690835, JAP. 0578399.
3,312,547.—XEROGRAPHIC PLATE AND PROCESSES OF MAKING AND USING SAME. APR. 4, 1967.
3,341,326.—DARK DECAY CONTROLLED XEROGRAPHY. SEPT. 12, 1967. AUS. 0285843, CAN. 0729829, FRA. 1377592, GRB. 1029199, ITL. 0706101.
3,352,669.—PHOTOCONDUCTIVE MEMBER AND PROCESSES OF PREPARING AND USING SAME. NOV. 14, 1967. AUS. 0405164, CAN. 0834670, FRA. 1422625, GER. 1497194, GRB. 1052970, HOL. 0137891, ITL. 0749420, JAP. 0501912.
3,393,070.—XEROGRAPHIC PLATE WITH ELECTRIC FIELD REGULATING LAYER. JULY 16, 1968. CAN. 0871308, GER. 1490987, GRB. 1141452, JAP. 0764435, MEX. 0105660.
3,508,918.—XEROGRAPHIC PLATE CONTAINING ALUMINUM SELENIDE BARRIER LAYER. APR. 28, 1970. CAN. 0872175.
3,539,255.—XEROGRAPHIC RECORDING APPARATUS - LIGHT-CONTROLLED-CHARGE STORAGE LAYER. NOV. 10, 1970.
3,573,906.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS. APR. 6, 1971. ARG. 0177890, AUS. 0441534, BEL. 0725173, BRA. 0088092, CAN. 0906801, CZC. 0157053, FRA. 1594981, GRB. 1217726, ITL. 0852743, SPN. 0379204, SWD. 0335063, USR. 0448658, VZL. 0029780.
3,619,153.—PHOTOCONDUCTIVE ELMNT AND PROCESS EMPLYNG SBSTUTD SILYLISOBUTYLETHYLENEDIAMINE ADHESIVE INTERLAYE. NOV. 9, 1971. ARG. 0180118, ATR. 0305764, AUS. 0434739, BEL. 0733402, BUL. 0017353, CAN. 0898034, DNK. 0131833, EGR. 0078900, FRA. 6917079, GRB. 1229559, GRK. 0040058, IND. 0121424, ISR. 0032250, ITL. 0864983, JAP. 0702563, LXB. 0058678, MEX. 0109385, NOR. 0125557, NZL. 0156506, PAK. 0121226, PLP. 0008481, PNM. 0001683, PTG. 0051754, RHD. 2236953, RMN. 0054256, SAF. 0693687, SPN. 0367618, STZ. 0511461, SWD. 0341926, TIW. 0006442, TRK. 0015647, USR. 0300036, VTM. 0001865.
3,713,821.—PHOTORECEPTOR INTERFACE. JAN. 30, 1973. ARG. 0194731, ATR. 0322357, AUS. 0464711, BEL. 0784453, CAN. 0964916, EGR. 0099870, FRA. 7220691, GRB. 1393612, ISR. 0039655, ITL. 0959793, SAF. 0723958, SPN. 0403454, STZ. 0554007, SWD. 0367491, VZL. 0032939.
3,720,514.—ELECTROPHOTOGRAPHIC PAPER HAVING AN IMONGANIC COLLOIDAL OXIDE COATING. MAR. 13, 1973.
3,738,831.—CHALCOGEN ORGANIC COMPOUNDS USED IN ELECTROPHOTOGRAPHIC PLATES AND PROCESS. JUNE 12, 1973.
3,758,301.—ELECTROPHOTOGRAPHIC USE OF SELENIUM CONTAINING POLYMERS. SEPT. 11, 1973.
3,795,513.—METHOD OF STORING AN ELECTROSTATIC IMAGE IN A MULTILAYERED PHOTORECEPTOR. MAR. 5, 1974. BEL. 0788303, CAN. 976018, FRA. 7230831, GRB. 1388934, ITL. 0964410, SWD. 7211341.
3,799,775.—XEROGRAPHIC SYSTEM. MAR. 26, 1974. ARG. 0172053, ATR. 0300559, AUS. 0423123, BEL. 0720940, BRA. 6800650, BUR. 0000043, CAM. 00043/3, CAN. 0895805, CHL. 0024257, EIR. 0032903, FRA. 1586238, GNR. 0000039, GRB. 1243384, GRK. 0039223, IND. 0119625, ISR. 0031543, ITL. 0844307, LEB. 0002816, LIB. P102693, LXB. 0056890, MEX. 0105163, MLG. 0003058, MLW. 00MW569, MNC. 8126975, MRC. 0014727, NOR. 0128132, NZL. 0153781, PAK. 0120895, PLP. 0009065, PNM. 0002053, PTG. 0050322, RHD. 5369487, SAF. 0681107, SPN. 0358355, STZ. 0506102, SWD. 0345530, TGR. 0000547, URG. 0009361, VTM. 0001830, VZL. 0023696, ZMB. 0156971.
3,816,288.—GLOW DISCHARGE TECHNIQUE FOR THE PREPARATION OF ELECTROPHOTOGRAPHIC PLATES. JUNE 11, 1974.
3,888,667.—HETROPHASE ADHESIVE COMPOSITIONS CONTAINING POLYSULFONE FOR METAL-SELENIUM COMPOSITIES. JUNE 10, 1975.
3,891,435.—HETEROPHASE ADHESIVE COMPOSITIONS CONTAINING CHLOROSULFONATED POLYETHLENE FOR METAL-SELENIUM CO. JUNE 24, 1975.
3,895,131.—ELECTROLESS COATING METHOD. JULY 15, 1975.
3,907,650.—PHOTOSENSITIVE BINDER LAYER FOR XEROGRAPHY. SEPT. 23, 1975.
3,914,126.—NICKEL OXIDE INTERLAYERS FOR PHOTOCONDUCTIVE ELEMENTS. OCT. 21, 1975.
3,958,207.—INJECTION CURRENT DEVICE AND METHOD. MAY 18, 1976.
4,011,078.—PHOTOSENSITIVE MEMBER AND METHOD OF IMAGING. MAR. 8, 1977.

Class 2B 2

2,860,048.—XEROGRAPHIC PLATE. NOV. 11, 1958.
2,886,434.—PROTECTED PHOTOCONDUCTIVE ELEMENT AND METHOD OF MAKING SAME—HORIZONS. MAY 12, 1959. CAN. 0621931.
3,092,493.—PROTECTED XEROGRAPHIC PLATE. JUNE 4, 1963.
3,146,145.—PROCESS FOR ADHERING PLASTIC TO VITREOUS SELENIUM. AUG. 25, 1964.
3,256,089.—MASKED PLATE XEROGRAPHY. JUNE 14, 1966.
3,397,982.—XIC PLATE W/INORGANIC GLASS BINDER HAVING OVERCOATING CONSISTING ESSENTIALLY OF ALUMINUM OXIDE. AUG. 20, 1968. ARG. 0150690, AUS. 0407349, BEL. 0674140, CAN. 0866142, FRA. 1460232, GER. 1497230, GRB. 1129674, ITL. 0822914, JAP. 0531894, MEX. 0085270, SWD. 0319976.
3,434,832.—XEROGRAPHIC PLATE COMPRISING A PROTECTIVE COATING OF A RESIN MIXED WITH A METALLIC STEARATE. MAR. 25, 1969. CAN. 0835883, FRA. 1454672, GER. 1497223, GRB. 1128156, ITL. 0772535, JAP. 0545757, MEX. 0085603.
3,488,189.—ELECTROPHOTOGRAPHIC RECORDING MEMBER HAVING SOLID CRYSTALLINE PLASTICIZR AVAILBL AT IMGNG SURFA. JAN. 6, 1970. CAN. 0866700, FRA. 1506810, GRB. 1183205, ITL. 0788976, JAP. 0570734, MEX. 0108241.
3,720,514.—ELECTROPHOTOGRAPHIC PAPER HAVING AN IMONGANIC COLLOIDAL OXIDE COATING. MAR. 13, 1973.
3,738,831.—CHALCOGEN ORGANIC COMPOUNDS USED IN ELECTROPHOTOGRAPHIC PLATES AND PROCESS. JUNE 12, 1973.
3,758,301.—ELECTROPHOTOGRAPHIC USE OF SELENIUM CONTAINING POLYMERS. SEPT. 11, 1973.
3,837,849.—MULTILAYERED VARIABLE SPEED PHOTORECEPTOR AND METHOD OF USING SAME. SEPT. 24, 1974. BEL. 0788302, CAN. 0978007, FRA. 7230830, GRB. 1401040, ITL. 0964409, SWD. 7211342.
3,850,630.—XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING INDIGOLD PIGMENTS. NOV. 26, 1974. ARG. 0188393, AUS. 0465971, BEL. 0763391, CAN. 0932198, CHL. 0027129, EGR. 0093923, FRA. 7107566, GRB. 1337221, ITL. 0919106, MEX. 0122099, NZL. 0162890, PNM. 0002480, SAF. 0711226, SPN. 0388591, TIW. 0006740, USR. 0463276.
3,856,548.—STRIPPABLE OVERCOATING FOR IMPROVED XEROGRAPHIC PLATES. DEC. 24, 1974. GRB. 1426030.
3,860,421.—N-ALKYL MORPHOLINE TREATMENT OF A SELENIUM-CONTAINING PHOTOCONDUCTIVE LAYER. JAN. 14, 1975.
3,868,983.—HAND TOOL. MAR. 4, 1975.
3,877,935.—NOVEL XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING POLYNUCLEAR QUINONE PIGMENTS. APR. 15, 1975. ARG. 0002614, AUS. 0452620, BEL. 0763389, CAN. 0932197, CHL. 0027120, FRA. 7107563, GRB. 1337224, GUA. 0002614, ITL. 0919103, MEX. 0122100, NZL. 0162887, PNM. 0002467, SAF. 0711223, SPN. 0388588, TIW. 0006741.
3,884,690.—POLYESTER PHOTOCONDUCTORS AND MATRIX MATERIALS. MAY 20, 1975.

3,884,825.—IMAGING COMPOSITION. MAY 20, 1975. AUS. 0467835, BEL. 0802879, CAN. 0995963, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 0417382.
3,896,184.—POLYMERS OF BENZANTHRACENE AS ACTIVE MATRIX MATERIALS. JULY 22, 1975.
3,900,589.—AN ELECTROSTATOGRAPHIC IMAGING PROCESS. AUG. 19, 1975. AUS. 0467835, BEL. 0802879, GRB. 1437041.
3,904,407.—XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING PERYLENE PIGMENTS. SEPT. 9, 1975. ARG. 0189747, AUS. 0465811, BEL. 0763388, CAN. 0933010, CHL. 0026796, EGR. 0093458, FRA. 7107562, GRB. 1337225, GUA. 0002799, ITL. 0919102, MEX. 0126620, PNM. 0002468, SAF. 0711222, SPN. 0388587, SWD. 0362509, TIW. 0007210, USR. 0473381.
3,912,511.—MULTICOMPONENT ORGANIC COATING OF POLYESTER POLYURETHAND AND HUMIDITY. OCT. 14, 1975. ARG. 0182692, BEL. 0767325, CAN. 0938143, FRA. 7118948, GRB. 1350476, ITL. 0926822, MEX. 0121668.
3,954,464.—METHOD OF FABRICATING A COMPOSITE TRIGONAL SELENIUM PHOTORECEPTOR. MAY 4, 1976.
3,961,953.—METHOD OF FABRICATING COMPOSITES TRIGONAL SELENIUM PHOTORECEPTORS. JUNE 8, 1976.
3,973,843.—ELECTROSTATOGRAPHIC IMAGING APPARATUS. AUG. 10, 1976. AUS. 0467835, BEL. 0802879, GRB. 1437041.
4,006,019.—METHOD FOR PREPARATION OF AN ELECTROSTATOGRAPHIC PHOTORECEPTOR. FEB. 1, 1977.
4,006,020.—OVERCOATED ELECTROSTATOGRAPHIC PHOTORECEPTOR. FEB. 1, 1977.
4,012,255.—OVERCOATED ELECTROSTATOGRAPHIC PHOTORECEPTOR. MAR. 15, 1977.
4,022,956.—POLYMERS OF BENZANTHRACENE AS ACTIVE MATRIX MATERIALS. MAY 10, 1977.

Class 2B 3

3,510,660.—METHOD FOR VISUAL COMPARISON OF INFORMATION. MAY 5, 1970. CAN. 0848611, GRB. 1201376, JAP. 0595641.
3,543,031.—DEVICE AND PROCESS FOR IMAGE STORAGE. NOV. 24, 1970. ARG. 0161299, AUS. 0432468, BEL. 0703461, CAN. 0862332, FRA. 1543309, GER. 1549142, GRB. 1201374, ITL. 0811521, JAP. 0742514, MEX. 0100142, SPN. 0344004, STZ. 0497022, SWD. 0354169, VZL. 0023663.

Class 2B 4

3,428,453.—IMAGE FORMING PROCESS UTILIZING XEROGRAPHY-ETCHING PROCESS. FEB. 18, 1969. CAN. 0856722, FRA. 1428775, GRB. 1085151, ITL. 0754825.
3,446,616.—XEROGRAPHIC IMAGING EMPLOYING A SELECTIVELY REMOVABLE LAYER. MAY 27, 1969.
3,926,626.—CIRCULATION IMAGING METHOD. DEC. 16, 1975.
4,007,372.—IMPROVED METHOD & ARTICLE FOR IMAGE REPRODUCTION. FEB. 8, 1977.
4,011,078.—PHOTOSENSITIVE MEMBER AND METHOD OF IMAGING. MAR. 8, 1977.

Class 2C

3,307,941.—PLASTIC DEFORMATION IMAGING FILM AND PROCESS. MAR. 7, 1967. CAN. 0801262.
3,317,316.—INTERNAL FROST RECORDING. MAY 2, 1967. ATR. 0272830, AUS. 0292886, BEL. 0648043, CAN. 0882890, FRA. 1399017, GER. 1243018, GRB. 1069741, ITL. 0725002, JAP. 0521009, LXB. 0046101, NOR. 0122729, STZ. 0469292, SWD. 0319083.
3,408,181.—HEAT DEFORMABLE RECORDING MATERIALS CONTAINING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMPLE. OCT. 29, 1968. CAN. 0843620, FRA. 1463744, GER. 1522677, GRB. 1138552, ITL. 0755286, MEX. 0109927.
3,443,937.—IMAGE RESOLUTION. MAY 13, 1969. CAN. 0824316, GRB. 1137766, JAP. 0544235.
3,443,938.—FROST IMAGING EMPLOYING A DEFORMABLE ELECTRODE. MAY 13, 1969. CAN. 0801263, FRA. 1441806, GRB. 1073097, JAP. 0573732.
3,526,879.—INTERNAL FROST RECORDING APPARATUS USING A DEFORMABLE PHOTOCONDUCTOR. SEPT. 1, 1970.
3,672,883.—CRYSTALLINE POLYMERS FOR FROST. JUNE 27, 1972.
3,672,886.—NOVOLAR RESINS IN DEFORMATION IMAGING. JUNE 27, 1972.
3,707,391.—IMAGING PROCESS. DEC. 26, 1972.
3,873,197.—APPARATUS FOR REGULATING THE TONER CONCENTRATION IN A ELECTROPHOTOGRAPHIC DEVICE. MAR. 25, 1975.
3,892,567.—ELECTROSTATICALLY DEFORMABLE MATERIALS. JULY 1, 1975. ARG. 0196065, BEL. 0781973, CAN. 9814520, FRA. 7213876, GRB. 1394286, ITL. 0951328, MEX. 0124825.
3,944,358.—COLOR IMAGE REPRODUCTION SYSTEMS. MAR. 16, 1976.
3,951,533.—COLOR IMAGE REPRODUCTION SYSTEM. APR. 20, 1976.
3,980,476.—IMAGING SYSTEM. SEPT. 14, 1976.
3,997,243.—COLOR IMAGE REPRODUCTION SYSTEM. DEC. 14, 1976.
4,023,969.—DEFORMABLE ELASTOMER IMAGING MEMBER EMPLOYING AN INTERNAL OPAQUE DEFORMABLE METALLIC LAYER. MAY 17, 1977.

Class 2D

3,411,903.—XEROGRAPHIC METHOD AND PLATE COMPRISING PHOTOCONDUCTIVE INSULATING FIBERS. NOV. 19, 1968. ARG. 0149620, ATR. 0270379, AUS. 0410718, BEL. 0672668, BRA. 0084119, CAN. 0834669, CHL. 0023648, CLB. 0014943, DNK. 0120577, EGR. 0055545, FRA. 1464792, GER. 1497224, GRB. 1084024, GRK. 0031509, IND. 0102560, ISR. 0024632, ITL. 0734376, JAP. 0724233, LXB. 0049849, MEX. 0098487, NOR. 0122817, NZL. 0143432, PLD. 0067959, PLP. 0004547, PNM. 0001533, PRU. 0008384, PTG. 0044879, SAF. 0656280, SPN. 0319795, STZ. 0458076, SWD. 0308250, THL. 1084024, TIW. 0003735, URG. 0006624, VZL. 0023996.
3,787,235.—METHOD OF ELECTROPHOTOGRAPHIC SENSITIVE PAPER. JAN. 22, 1974.
3,951,658.—COLOR MODIFYING IMAGING METHOD AND ARTICLE. APR. 20, 1976.

Class 2E

2,599,542.—ELECTROPHOTOGRAPHIC PLATE. JUNE 10, 1952.
2,657,152.—PROCESS OF PRODUCING AN ELECTROPHOTOGRAPHIC PLATE. OCT. 27, 1953. AUS. 0152887, CAN. 0516075, FRA. 1039677, GER. 0893010, GRB. 0687704, HOL. 0082956, SAF. 0012307, STZ. 0296692, SWD. 0148967.
2,662,832.—PROCESS OF PRODUCING AN ELECTROPHOTOGRAPHIC PLATE. DEC. 15, 1953.
2,663,636.—ELECTROPHOTOGRAPHIC PLATE AND METHOD OF PRODUCING SAME. DEC. 22, 1953. CAN. 0512461, GER. 0872427, GRB. 0693112, HOL. 0095533, SAF. 0012644, STZ. 0290324, SWD. 0148966.
3,341,681.—XEROGRAPHIC PLATE FABRICATION. SEPT. 12, 1967. CAN. 0780598, FRA. 1415795, GRB. 1070555, HOL. 0144068, IND. 0094992, ITL. 0738063.
3,350,203.—XEROGRAPHIC PLATE. OCT. 31, 1967. CAN. 0715017, FRA. 1421950, GER. 1270400, GRB. 1085989, ITL. 0750417, JAP. 0511420.
3,447,957.—METHOD OF MAKING A SMOOTH SURFACED ADHESIVE BINDER XEROGRAPHIC PLATE. JUNE 3, 1969. CAN. 0788947.
3,468,705.—METHOD OF PREPARING LEAD OXIDE FILMS. SEPT. 23, 1969. CAN. 0806134, FRA. 1501511, GER. 1521942, GRB. 1170428, ITL. 0787638, JAP. 0634868, MEX. 0093335.
3,472,679.—COATING SURFACES. OCT. 14, 1969. CAN. 0896992.
3,536,397.—XEROGRAPHIC APPARATUS. OCT. 27, 1970. CAN. 0917231.
3,536,481.—ELECTROLYTIC PROCESS OF FORMING A XEROGRAPHIC BELT. OCT. 27, 1970. ARG. 0175659, AUS. 0416583, BEL. 0716410, CAN. 0865080, FRA. 1572605, GRB. 1200670, ITL. 0859021, MEX. 0103043, SWD. 0345698.
3,536,485.—XEROGRAPHIC PLATE SUPPORTED BY A MANDREL. OCT. 27, 1970.
3,578,445.—XEROGRAPHIC PLATE FABRICATION. MAY 11, 1971.
3,634,134.—METHOD OF MAKING A PHOTOCONDUCTIVE COMPOSITION AND DEVICE. JAN. 11, 1972. ARG. 0184074, ATR. 0307226, AUS. 449514, BEL. 0752440, CAN. 0904111, EGR. 0083703, FRA. 7023473, GRB. 1319342, ITL. 0894622, MEX. 0117839, PNM. 0002547, SPN. 0381111, STZ. 0548624, SWD. 0351734, TIW. 0007153.
3,695,757.—XEROGRAPHIC PLATE. OCT. 3, 1972.
3,746,571.—METHOD OF VACUUM EVAPORATION. JULY 17, 1973.

3,752,691.—METHOD OF VACUUM EVAPORATION. AUG. 14, 1973.

3,756,811.—ELECTROPHOTOGRAPHIC PROCESS EMPLOYING PHOTOCONDUCTIVE MATERIALS OF DIFFERENT DYNAMIC RANGES. SEPT. 4, 1973. CAN. 0894715, GRB. 1226578.

3,787,208.—XEROGRAPHIC IMAGE MEMBER HAVING PHOTOCONDUCTIVE MATERIAL IN INTERLOCKING CONTINUOUS PATHS. JAN. 22, 1974. ARG. 0186443, ATR. 0451252, BEL. 0763544, CAN. 0925741, CHL. 0026794, FRA. 7107567, GRB. 1296291, ITL. 0918909, MEX. 0122096, NZL. 0162891, PLP. 0009378, PNM. 0002396, SAF. 0711227, SPN. 0388639, STZ. 0568591, SWD. 0367259, TIW. 0007844, USR. 0398062.

3,788,889.—METHOD OF PREPARING BINDER LAYERS. JAN. 29, 1974.

3,837,906.—METHOD OF MAKING A XEROGRAPHIC BINDER LAYER AND LAYER SO PREPARED. SEPT. 24, 1974. ARG. 0186444, ATR. 0319750, AUS. 0448147, BEL. 0763392, CAN. 0939204, CHL. 0027098, FRA. 7107568, GRB. 1292425, ITL. 0918910, NZL. 0162892, PNM. 0002439, SAF. 0711228, SPN. 0388640, STZ. 0558554, SWD. 0036479, TIW. 0007713.

3,856,548.—STRIPPABLE OVERCOATING FOR IMPROVED XEROGRAPHIC PLATES. DEC. 24, 1974. GRB. 1426030.

3,894,868.—ELECTRON TRANSPORT BINDER STRUCTURE. JULY 15, 1975. AUS. 0461951, BEL. 0763543, CAN. 0932196, CHL. 0026795, EGR. 0096346, FRA. 7107561, GRB. 1337226, GUA. 0002467, ITL. 0919110, MEX. 0120807, NZL. 0162885, PNM. 0002481, SAF. 0711221, SPN. 0388586, TIW. 0007182, USR. 0444380.

3,911,091.—MILLING TRIGONAL SELENIUM PARTICLES TO IMPROVED XEROGRAPHIC PERFORMANCE. OCT. 7, 1975.

3,911,162.—SYSTEM FOR VAPOR DEPOSITION OF THIN FILMS. OCT. 7, 1975. BEL 0798324.

3,926,762.—R F SPUTTERING OF TRIGONAL SELENIUM FILM. DEC. 16, 1975.

3,944,682.—METHOD OF PROVIDING AN ELECTROPHOTOGRAPHIC COATING AND COMPOSITIONS FOR METHOD. MAR. 16, 1976.

3,945,723.—RESILIENT ROLLERS. MAR. 23, 1976. ARG. 0205448.

3,954,466.—ELECTROSTATOGRAPHIC PHOTORECEPTOR. MAY 4, 1976.

3,979,495.—METHOD OF MAKING A PHOTORECPTOR. SEPT. 7, 1976.

3,984,183.—SHEET STRIPPING FROM IMAGING SURFACE. OCT. 5, 1976. BEL. 0836791.

3,992,091.—ROUGHENED IMAGING SURFACE FOR CLEANING. NOV. 16, 1976.

4,014,697.—ELECTROSTATOGRAPHIC IMAGING MEMBER. MAR. 29, 1977.

4,014,728.—METHOD OF MAKING AN IMAGING MEMBER. MAR. 29, 1977.

4,015,985.—COMPOSITE XEROGRAPHIC PHOTORECPTOR WITH INJECTING CONTACT LAYER. APRIL 5, 1977. BEL. 0840221.

4,016,310.—COATR HRDWR AND METH FOR OBTNG UNFRM PHROCNDTV LAYR ON A XEROGRAPHIC PHOTORECEPTOR. APR. 5, 1977.

4,023,523.—COATING HARDWARE AND METHOD FOR OBTAINING UNIFORM PHOTOCONDUCTIVE LAYERS ON A XEROGRAPHIC PHOTO. MAY 17, 1977.

4,025,188.—PHOTOACTIVE DEVICE FOR XEROGRAPHY. MAY 24, 1977.

4,033,768.—METHOD FOR THE PREPARATION OF AN ELECTROSTATOGRAPHIC PHOTOSENSITIVE DEVICE. JULY 5, 1977.

Class 2F

2,619,418.—XEROGRAPHIC PLATE HOLDER. NOV. 25, 1952.

3,143,044.—XEROGRAPHIC PLATE HOLDER. AUG. 4, 1964.

3,592,071.—BELT TRACKING APPARATUS. JULY 13, 1971. ARG. 0179666, BEL. 0751117, CAN. 0925118, FRA. 7019040, GRB. 1298926, ITL. 0893540, JAP. 0770135, MEX. 0118981, SPN. 0380136.

3,765,757.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. OCT. 16, 1973. BEL. 0793551, GRB. 1419978, ITL. 0972846, SPN. 0410107.

3,820,888.—MISTRACK INTERLOCK FOR SELENIUM BELT. JUNE 28, 1974.

3,867,027.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. FEB. 18, 1975. BEL. 0793551, CAN. 1004289, GRB. 1419978, ITL. 0972846, SPN. 0410107.

3,874,790.—FAIL-SAF MECH STPNG MVMNT PHTCNDCTV BLT ELTRSTC REPRDCTN MACH WHEN TRCKNG BECOMES IREGULAR AND UN. APR. 1, 1975.

3,888,577.—APPARATUS FOR PACKAGING AND SUBSEQUENTLY INSTALLING A BELT ONTO A ROLLER ASSEMBLY. JUNE 10, 1975. BEL. 0810900.

3,994,053.—DRUM SUPPORT APPARATUS. NOV. 30, 1976.

4,005,285.—OPTICAL SYSTEM FOR EXTENDING PHOTOSENSOR ARRAY RESOLUTION. JAN. 25, 1977.

4,009,388.—ARRANGEMENT FOR EXTENDING PHOTOSENSOR ARRAY SOLUTION. FEB. 22, 1977.

4,027,966.—TRACKING ASSEMBLY FOR AN ENDLESS BELT ELECTROSTATIC REPRODUCTION MACHINE. JUNE 7, 1977.

Class 3

3,935,517.—CONSTANT CURRENT CHARGING DEVICE. JAN. 27, 1976.

Class 3A

2,833,648.—TRANSFER OF ELECTROSTATIC CHARGE PATTERN. MAY 6, 1958. BEL. 0530462, FRA. 1110794, GER. 1063899, GRB. 0773604, HOL. 0130249, JAP. 0238843, STZ. 0330512.

2,833,930.—ELECTROSTATIC CHARGING METHOD AND APPARATUS. MAY 6, 1958. CAN. 0564954.

2,934,649.—INDUCTION CHARGING. APR. 26, 1960. CAN. 0616346.

3,172,024.—CHARGE INDUCTION. MAR. 2, 1965. CAN. 0809341, FRA. 1294161, GER. 1414991, GRB. 0958663, JAP. 0455338.

3,254,998.—INDUCTION IMAGE FORMATION. JUNE 7, 1966. CAN. 0740576, FRA. 1357220, GER. 1276445, GRB. 1024985, JAP. 0451689.

3,288,602.—XEROGRAPHIC PLATE AND METHOD. NOV. 29, 1966. CAN. 0795978, GER. 1237902, GRB. 1029181, ITL. 0690835, JAP. 0578399.

3,684,364.—LIFTOFF ELECTRODE. AUG. 15, 1972.

3,842,273.—CORONA GENERATOR CLEANING APPARATUS. OCT. 15, 1974. AUS. 0480142, BEL. 0817485. GRB. 1458088, SPN. 0428358.

3,884,181.—CAPILLARY BAFFLE-CONSTANT OIL HEIGHT INDEPENDENT TO OIL LEVEL. MAY 20, 1975.

3,893,800.—BACKSIDE HEATING AND FIXING APP IN AN ELECTRONIC PHOTOGRAPH DUPLICATOR. JULY 8, 1975.

3,957,423.—STRIPPER FINGER DESIGN. MAY 18, 1976.

Class 3B

2,912,586.—XEROGRAPHIC CHARGING. NOV. 10, 1959.

3,160,746.—CORONA CHARGING APPARATUS FOR NONUNIFORMLY CHARGING A XEROGRAPHIC PLATE IN A PREDETERMINED MAN. DEC. 8, 1964. GER. 1197475, GRB. 1011793, JAP. 0484759.

3,288,602.—XEROGRAPHIC PLATE AND METHOD. NOV. 29, 1966. CAN. 0795978, GER. 1237902, GRB. 1029181, ITL. 0690835, JAP. 0578399.

3,449,568.—CORONA DISCHARGE APPARATUS FOR CREATING AN ELECTROSTATIC CHARGE PATTERN ON A XEROGRAPHIC SURFAC. JUNE 10, 1969. CAN. 0858664.

3,532,494.—SOLID AREA DEVELOPMENT IN XEROGRAPHY EMPLOYING AN INSULATING SCREEN IN THE CHARGING STEP. OCT. 6, 1970.

3,543,022.—METH AND APPARATUS CHARG DISCRETE SMALL AREAS XEROGRAPHIC PLATES TO DIF POTENT CONT TONE PRINTG. NOV. 24, 1970. CAN. 0921971, GRB. 1186599.

3,784,299.—DARK DECAY RETARDATION. JAN. 8, 1974.

3,981,498.—NON-UNIFORM CHARGING OF SHEET MATERIAL. SEPT. 21, 1976.

Class 3C

2,543,051.—METHOD OF CHARGING AND EXPOSING ELECTROPHOTOGRAPHIC PLATES. FEB. 27, 1951.

2,705,675.—PLATE CHARGING CIRCUIT FOR ELECTROPHOTOGRAPHY. APR. 5, 1955.

2,741,959.—ELECTROPHOTOGRAPHY. APR. 17, 1956. CAN. 0533763.

2,836,725.—CORONA CHARGING DEVICE. MAY 27, 1958. CAN. 0571450, FRA. 1188606, GER. 1787078, GRB. 0826088.

2,868,989.—ELECTROSTATIC CHARGING METHOD AND DEVICE. JAN. 13, 1959. CAN. 0584243.

2,965,756.—ELECTROSTATIC CHARGING APPARATUS. DEC. 20, 1960.

3,017,509.—XEROGRAPHIC PLATE FEEDING AND CHARGING APPARATUS. JAN. 16, 1962.
3,122,634.—CONTROLLED CHARGING IN XEROGRAPHIC COPYING APPARATUS. FEB. 25, 1964. CAN. 0706543, FRA. 1352624, GER. 1210323, GRB. 1026262, JAP. 0446815.
3,160,746.—CORONA CHARGING APPARATUS FOR NON-UNIFORMLY CHARGING A XEROGRAPHIC PLATE IN A PREDETERMINED MAN. DEC. 8, 1964. GER. 1197475, GRB. 1011793, JAP. 0484759.
3,335,274.—XIC CHARGING APPARATUS WITH MEANS TO AUTOMATICALLY CONTROL THE POT ENTAIL APPLIED TO THE CORONA. AUG. 8, 1967. CAN. 0801834, FRA. 1459487, GRB. 1121498, ITL. 0734870, MEX. 0085777.
3,382,360.—XIC CHARGING SYSTEM HAVING MEANS FOR PROVIDING AN AIR CUSHION BETWEEN CHARGING DEVICE AND XIC DR. MAY 7, 1968.
3,457,405.—CORONA WIRE MOUNTING MEANS WHICH COMPENSATES FOR WIRE EXPANSION DUE TO HEAT. JULY 22, 1969. CAN. 0857406, GRB. 1196927.
3,471,695.—CORONA CHGNG APPTS W/MEANS TO URGE A FLOW OF AERIFORM FLUID ACROSS THE CORONA WIRES. OCT. 7, 1969. CAN. 0856355, GRB. 1220745.
3,483,372.—CORONA CHARGING DEVICE WITH CONDUCTIVE SHIELD AND INSULATING MEANS ON SAID SHIELD. DEC. 9, 1969. CAN. 0840508, GRB. 1169632, JAP. 0770817.
3,517,995.—METHOD AND APPARATUS FOR INCREASING THE EFFICIENCY OF CORONA CHARGNG. JUNE 30, 1970. ARG. 0172471, BEL. 0721553, CAN. 0856714, FRA. 1585283, GRB. 1247034, ITL. 0844214, JAP. 0708414, MEX. 0103113, VZL. 0023701.
3,566,108.—CORONA GENERATING ELECTRODE STRUCTURE FOR USE IN A XEROGRAPHIC CHARGING METHOD. FEB. 23, 1971.
3,598,991.—ELCTRSTC CHRGNG DEV HAVNG SPRK GAP VOLTG REGULTR BETWEEN A CORONA SOURCE AND VOLTG SOURCE. AUG. 10, 1971. AUS. 0457211, BEL. 0754426, CAN. 0916233, CZC. 0163219, EGR. 0084558, FRA. 7029148, GRB. 1322378, ITL. 0901159, JAP. 0715800, PLD. 0070053, SPN. 0382404, STZ. 0513436, SWD. 0359663, TIW. 0007173, USR. 0442617.
3,604,925.—APPARATUS FOR CONTROLLING THE AMOUNT OF CHARGE APPLIED TO SURFACE. SEPT. 14, 1971.
3,612,864.—IMAGING SYSTEM UTILIZING AN ELECTRODE TREATED W/MIXTURE OF HYDROSCOPIC MATERIAL AND HYDROPHILIC B. OCT. 21, 1971.
3,675,011.—METHODS AND APPARATUS FOR OPERATING RAISED COROTRONS OF OPPOSITE POLARITY. JULY 4, 1972.
3,723,793.—COATED CORONA GENERATING ELECTRODE. MAR. 27, 1973.
3,742,237.—AC CORONA CHARGING APPARATUS. JUNE 26, 1973. CAN. 0955299, GRB. 1387209.
3,760,229.—A C COROTRON. SEPT. 18, 1973. GRB. 1410671.
3,769,506.—CORONA GENERATING METHOD AND APPARATUS THEREFOR. OCT. 30, 1973.
3,790,999.—CORONA WIRE APPARATUS. FEB. 12, 1974.
3,800,153.—ELECTROPHOTOGRAPHY CHARGING DEVICE. MAR. 26, 1974.
3,813,547.—CORONA GENERATING APPARATUS. MAY 28, 1974.
3,813,548.—CORONA GENERATING METHODS AND APPARATUS THEREFOR. MAY 28, 1974.
3,816,749.—EXPOSURE CONTROLLED CORONA DEVICE. JUNE 11, 1974.
3,851,229.—CURRENT MEASURING DEVICE. NOV. 26, 1974.
3,870,883.—ELECTROSTATIC PRINTING MACHINE WITH SELF-CLEANING CORONAL GENERATING DEVICE. MAR. 11, 1975.
3,901,189.—MAGNETIC BRUSH DEVELOPING APPARATUS. AUG. 26, 1975.
3,919,605.—CORONA DISCHARGE APPARATUS. NOV. 11, 1975.
3,922,548.—CORONA CHARGING DEVICE AND SUPPORT ARRANGEMENT. NOV. 25, 1975.
3,937,960.—CHARGING DEVICE FOR ELECTROPHOTOGRAPHY. FEB. 10, 1976.
3,939,386.—TECHNIQUE FOR CHARGING DIELECTRIC SURFACES TO HIGH VOLTAGE. FEB. 17, 1976.
3,950,680.—ELECTROSTATOGRAPHIC DIAGNOSTIC SYSTEM. APR. 13, 1976.
3,976,880.—CORONA STABILIZATION ARRANGEMENT. AUG. 24, 1976.
3,976,881.—ARRANGEMENT FOR STABILIZING CORONA DEVICES. AUG. 24, 1976.
3,978,379.—CORONA GENERATING DEVICE WITH AN IMPROVED CLEANING MECHANISM. AUG. 31, 1976.
3,983,393.—CORONA DEVICE WITH REDUCED OZONE EMISSION. SEPT. 28, 1976.
3,996,466.—TRANSFER CORONA DEVICE WITH ADJUSTABLE SHIELD BIAS. DEC. 7, 1976.
4,027,960.—TRANSFER SYSTEM FOR ELECTROSTATIC REPRODUCTION MACHINE. JUNE 7, 1977.
4,038,544.—IMPROVED APPARATUS AND METHOD FOR DEVELOPING AN ELECTROSTATIC LATENT IMAGE. JULY 26, 1977.
4,038,546.—AN IMPROVED APPARATUS FOR A CORONA GENERATING DEVICE. JULY 26, 1977.

Class 3C 1

2,790,082.—XEROGRAPHIC CHARGING DEVICE. APR. 23, 1957.
2,879,395.—CHARGING DEVICE. MAR. 24, 1959. CAN. 0604246.
2,885,556.—SIMULTANEOUS CHARGING DEVICE AND METHOD. MAY 5, 1959. CAN. 0638188.
2,932,742.—XEROGRAPHIC CHARGING DEVICE AND METHOD. APR. 12, 1960. CAN. 0606202, FRA. 1150711, GER. 1099848, GRB. 0822555.
2,965,481.—ELECTROSTATIC CHARGING AND IMAGE FORMATION. DEC. 20, 1960. CAN. 0746571.
3,076,092.—XEROGRAPHIC CHARGING APPARATUS. JAN. 29, 1963.
3,275,837.—XEROGRAPHIC CHARGING APPARATUS. SEPT. 27, 1966. ARG. 0158430, ATR. 0242511, AUS. 0276177, BEL. 0642095, CAN. 0753356, FRA. 1385736, GER. 1488286, GRB. 1040264, ITL. 0712888, JAP. 0477814, MEX. 0075819, STZ. 0460930, SWD. 0314133.
3,307,034.—TWO-WIRE CORONA DISCHARGE SYSTEM FOR SINGLE-STEP ELECTROSTATIC IMAGE FORMATION. FEB. 28, 1967. CAN. 0768802, FRA. 1416275, GER. 1275864, GRB. 1055416, ITL. 0744235, JAP. 0491997.
3,492,476.—ELECTROSTATIC CHARGING DEVICE UTILIZING BOTH AC AND DC FIELDS. JAN. 27, 1970. ARG. 0175174, ATR. 0300573, AUS. 0425768, BEL. 0729976, CAN. 0862232, CHL. 0024600, CZC. 0158639, DNK. 0126728, EGR. 0081574, EIR. 0032976, FRA. 6907701, GRB. 1255998, GRK. 0039915, IND. 0120218, ISR. 0031765, ITL. 0860063, LXB. 0058234, MEX. 0108894, NOR. 0129709, NZL. 0155636, PAK. 0120995, PLD. 0017649, PLP. 0007523, PNM. 0001813, PTG. 0051315, RHD. 1096947, RMN. 0055216, SAF. 0691730, SPN. 0364888, STZ. 0493014, SWD. 0341528, UAR. 0009212, USR. 0318248, VTM. 0001845, VZL. 0023731.
3,873,895.—TECHNIQUE FOR CHARGING DIELECTRIC SURFACES TO HIGH VOLTAGE. MAR. 25, 1975.
3,886,416.—METHOD AND APPARATUS FOR ADJUSTING COROTRON CURRENTS. MAY 27, 1975.
3,908,164.—CORONA CURRENT MEASUREMENT AND CONTROL ARRANGEMENT. SEPT. 23, 1975.
3,921,042.—ELECTROSTATIC REPRODUCTION MACHINE WITH IMPROVED CORONA GENERATING DEVICE. NOV. 18, 1975.
3,961,193.—SELF ADJUSTING CORONA DEVICE. JUNE 1, 1976.
3,984,182.—PRETRANSFER CONDITIONING FOR ELECTROSTATIC PRINTING. OCT. 5, 1976.
4,038,593.—REGULATED HIGH VOLTAGE AC POWER SUPPLY WITH REGULATED DC BIAS CURRENT. JULY 26, 1977. BEL. 0846572.

Class 3C 2

2,856,533.—MOVING WIRE CORONA. OCT. 14, 1958.
3,304,476.—TRANSFER SWITCH FOR A XEROGRAPHIC APPARATUS. FEB. 14, 1967.
3,433,948.—NEGATIVE CORONA DISCHARGE SYSTEM USING ALTERNATING ELECTRIC FIELDS ACROSS THE AIR GAP. MAR. 18, 1969. CAN. 0855811, FRA. 1564157, GRB. 1211442, ITL. 0829718, JAP. 0655407.
3,541,329.—NEGATIVE CORONA DEVICE WITH MEANS FOR PRODUCING A REPELLING ELECTROSTATIC FIELD. NOV. 17, 1970. CAN. 0841136, FRA. 1546256, GRB. 1205040, JAP. 0634886.

Class 3C 3

2,774,921.—APPARATUS FOR ELECTROSTATICALLY CHARGING INSULATING IMAGE SURFACES FOR ELECTROPHOTOGRAPHY. DEC. 18, 1956.
2,934,650.—CHARGING APPARATUS. APR. 26, 1960. CAN. 0596221.
3,146,385.—XEROGRAPHIC PLATE CHARGING METHOD AND APPARATUS. AUG. 25, 1964. GRB. 1013924.

3,649,830.—UNIFORM CHARGING METHOD AND APPARATUS USING AN ARRAY OF NEEDLE ELECTRODES. MAR. 14, 1972.
3,655,966.—ELECTRIC CHARGING DEVICE FOR ELECTROPHOTOGRAPHY. APR. 11, 1972.
3,689,767.—METHOD AND APPARATUS FOR UNIFORMLY CHARGING THE SURFACE OF AN INSULATING MEMBER. SEPT. 5, 1972.
3,709,595.—PRINTER SYSTEM. JAN. 9, 1973.

Class 3C 4

2,777,957.—CORONA DISCHARGE DEVICE. JAN. 15, 1957. AUS. 0153841, CAN. 0558592, FRA. 1041698, GER. 0924420, GRB. 0696515, PNM. 0001841, SAF. 0012801, STZ. 0296687, SWD. 0159714.
2,778,946.—CORONA DISCHARGE DEVICE AND METHOD OF XEROGRAPHIC CHARGING. JAN. 22, 1957. CAN. 0558259.
2,965,754.—DOUBLE SCREEN CORONA DEVICE. DEC. 20, 1960. CAN. 0622926.
3,062,956.—XEROGRAPHIC CHARGING APPARATUS - SCOROTRON CONTROL CIRCUIT - PHILCO PRINTER PROCESSOR. JUNE 11, 1962. CAN. 0686702.
3,068,356.—XEROGRAPHIC CHARGING APPARATUS. DEC. 11, 1962. CAN. 0681400, GER. 1214996, GRB. 0990114.
3,220,324.—PHOTOCONDUCTIVELY CONTROLLED CORONA CHARGING. NOV. 30, 1965. CAN. 0710976, GER. 1243967, GRB. 1034009, JAP. 0651092.
3,307,034.—TWO-WIRE CORONA DISCHARGE SYSTEM FOR SINGLE-STEP ELECTROSTATIC IMAGE FORMATION. FEB. 28, 1967. CAN. 0768802, FRA. 1416275, GER. 1275864, GRB. 1055416, ITL. 0744235, JAP. 0491997.
3,492,476.—ELECTROSTATIC CHARGING DEVICE UTILIZING BOTH AC AND DC FIELDS. JAN. 27, 1970. ARG. 0175174, ATR. 0300573, AUS. 0425768, BEL. 0729976, CAN. 0862232, CHL. 0024600, CZC. 0158639, DNK. 0126728, EGR. 0081574, EIR. 0032976, FRA. 6907701, GRB. 1255998, GRK. 0039915, IND. 0120218, ISR. 0031765, ITL. 0860063, LXB. 0058234, MEX. 0108894, NOR. 0129709, NZL. 0155636, PAK. 0120995, PLD. 0017649, PLP. 0007523, PNM. 0001813, PTG. 0051315, RHD. 1096947, RMN. 0055216, SAF. 0691730, SPN. 0364888, STZ. 0493014, SWD. 0341528, UAR. 0009212, USR. 0318248, VTM. 0001845, VZL. 0023731.
3,496,351.—CORONA CONTROL CIRCUIT FOR STEPPING XEROGRAPHIC RECORDNG APPARATUS. FEB. 17, 1970. CAN. 0834978, FRA. 1512919, GRB. 1170472, ITL. 0793742, JAP. 0923309.
3,688,107.—ELECTROSTATOGRAPHIC CHARGING APPARATUS. AUG. 29, 1972. CAN. 0938660, GRB. 1365130.
3,875,407.—CORONA GENERATOR CLEANING APPARATUS. APR. 1, 1975.
3,908,127.—CORONA GENERATING DEVICES. SEPT. 23, 1975.
3,909,614.—SCOROTRON POWER SUPPLY CIRCUIT. SEPT. 30, 1975.
3,936,635.—CORONA GENERATING DEVICE. FEB. 3, 1976.

Class 3C 5

2,885,556.—SIMULTANEOUS CHARGING DEVICE AND METHOD. MAY 5, 1959. CAN. 0638188.
2,965,481.—ELECTROSTATIC CHARGING AND IMAGE FORMATION. DEC. 20, 1960. CAN. 0746571.
3,970,381.—METHOD AND APPARATUS FOR XEROGRAPHIC REPRODUCTION. JULY 20, 1976. BEL. 0811188.

Class 3C 6

2,701,764.—ELECTROPHOTOGRAPHIC APPARATUS AND METHODS. FEB. 8, 1955.
3,549,962.—UNIFORM ELECTROSTATIC CHARGING. DEC. 22, 1970. CAN. 0897757, GRB. 1189578.
3,648,133.—UNIFORM ELECTROSTATIC CHARGING OF A PHOTOCONDUCTIVE INSULATING SURFACE. MAR. 7, 1972.
3,743,830.—DEVICE FOR UNIFORMLY CHARGING A NON PLANAR ELECTROPHOTOGRAPHIC PLATE. JULY 3, 1973.
3,764,866.—CORONA GENERATOR. OCT. 9, 1973. ARG. 0198185, ATR. 0325420, AUS. 0467386, BEL. 0793227, CZC. 0168018, DNK. 0131699, FRA. 7245484, GRB. 1402739, ITL. 0972692, MEX. 0128581, NZL. 0169420, PTG. 0058386, SAF. 0729029, STZ. 0553435, SWD. 7216596.
3,792,913.—XEROGRAPHIC ERASE MECHANISM. FEB. 19, 1974. GRB. 1422175.
3,811,048.—ELECTROPHOTOGRAPHIC CHARGING APPARATUS. MAY 14, 1974.
3,967,119.—CORONA CHARGING DEVICE. JUNE 29, 1976.
3,967,891.—IMAGING SYSTEM FOR ELECTROSTATIC REPRODUCTION MACHINE. JULY 6, 1976.

Class 3C 7

3,323,373.—ESCAPEMENT MECHANISM. JUNE 6, 1967. CAN. 0841310.
3,324,291.—CORONA GENERATING DEVICE W/MEANS TO CAUSE AIR FLOW THERE-THROUGH TO MAINTN PARTS FREE OF DUST. JUNE 6, 1967. CAN. 0794904, GRB. 1070615, JAP. 0512648.
3,339,069.—CORONA CHARGING DEVICE W/MEANS TO PREVENT TONER DUST CONTAMINATION. AUG. 29, 1967. CAN. 0788539, FRA. 1450010, GRB. 1116687, ITL. 0730715, JAP. 0875339, MEX. 0089459.
3,496,352.—SELF-CLEANING CORONA GENERATING APPARATUS. FEB. 17, 1970. CAN. 0856356, GRB. 1227987, JAP. 0641478.
3,743,540.—SURFACE CLEANING BY IONIZED FLOW. JULY 3, 1973.
3,794,839.—CORONA GENERATING APPARATUS. FEB. 26, 1974. GRB. 1434863.
3,942,006.—CORONA GENERATOR CLEANING APPARATUS. MAR. 2, 1976.
3,965,400.—CORONA GENERATING DEVICE WITH IMPROVED BUILT IN CLEANING MECHANISM. JUNE 22, 1976.
4,019,055.—CORONA CLEANING ASSEMBLY. APR. 19, 1977. BEL. 0795870, GRB. 1416480.

Class 3C 8

3,335,273.—XIC CHARGING APPARATUS W/MEANS TO TERMINATE CHARGING CYCLE WHEN A PREDETERMINED CHARGE IS OBTAI. AUG. 8, 1967. CAN. 0794905, FRA. 1462556, GRB. 1128618, ITL. 0743940, JAP. 0632530, MEX. 0087314.
3,335,275.—XIC CHARGNG APPTS W/ADJSTBL MEANS TO TERMINATE CHRGNG CYCLE WHEN PREDETERMINED CHARGE IS OBTAI. AUG. 8, 1967. CAN. 0801833.
3,667,036.—ELECTROMETER AMPLIFIER CIRCUITS. MAY 30, 1972.
3,678,350.—ELECTRIC CHARGING METHOD. JULY 18, 1972.
3,805,069.—REGULATED CORONA GENERATOR. APR. 16, 1974.
3,934,141.—APPARATUS FOR AUTOMATICALLY REGULATING THE AMOUNT OF CHARGE APPLIED TO AN INSULATING SURFACE. JAN. 20, 1976.
3,944,356.—A CHARGING APPARATUS. MAR. 16, 1976.
3,980,929.—CORONA CURRENT INTERRUPTER. SEPT. 14, 1976.

Class 3C 9

2,934,650.—CHARGING APPARATUS. APR. 26, 1960. CAN. 0596221.
3,557,367.—METHOD AND APPARATUS FOR INCREASING THE EFFICIENCY OF CORONA CHARGING OF A PHOTOCONDUCTOR. JAN. 19, 1971. ARG. 0170822, BEL. 0720017, BRA. 6800368, CAN. 0879279, FRA. 1597512, GRB. 1244378, ITL. 0840366, JAP. 0628391, MEX. 0105427, VZL. 0023699.
3,582,731.—CHARGING SYSTEM. JUNE 1, 1971. CAN. 0906045.
3,765,026.—ELECTROGRAPHIC RECORDING SYSTEM. OCT. 9, 1973. CAN. 0948272, GRB. 1365346.

Class 3D

2,987,660.—XEROGRAPHIC CHARGING. JUNE 6, 1961.
3,394,002.—CHARGE TRANSFER WITH LIQUID LAYERS. JULY 23, 1968. CAN. 0840028, GRB. 1126048, JAP. 0524527.
3,398,336.—ELECTRICAL CHARGING UTILIZING TWO PHASE LIQUID MEDIUM. AUG. 20, 1968. CAN. 0815738, GRB. 1149074, JAP. 0562387.
3,687,106.—DONOR APPARATUS AND METHOD. AUG. 29, 1972. ARG. 0185079, BEL. 0753207, CAN. 0911706, FRA. 7027124, GRB. 1314862, ITL. 0900444, JAP. 0733285, MEX. 0117318, PNM. 0002237, VZL. 0027517.
3,907,559.—IMGNG PRCS EMPLYNG FRCTN CHRGNG IN THE PRESENCE OF AN ELECTRICALLY INSULATING DEVELOPER LIQUID. SEPT. 23, 1975.

3,971,658.—IMAGING PROCESS EMPLOYING FRICTION CHARGING IN THE PRESENCE OF AN ELECTRICALLY INSULATING LIQUID. JULY 27, 1976.

Class 3E

3,172,024.—CHARGE INDUCTION. MAR. 2, 1965. CAN. 0809341, FRA. 1294161, GER. 1414991, GRB. 0958663, JAP. 0455338.

3,254,998.—INDUCTION IMAGE FORMATION. JUNE 7, 1966. CAN. 0740576, FRA. 1357220, GER. 1276445, GRB. 1024985, JAP. 0451689.

Class 3F

2,833,648.—TRANSFER OF ELECTROSTATIC CHARGE PATTERN. MAY 6, 1958. BEL. 0530462, FRA. 1110794, GER. 1063899, GRB. 0773604, HOL. 0130249, JAP. 0238843, STZ. 0330512.

2,833,930.—ELECTROSTATIC CHARGING METHOD AND APPARATUS. MAY 6, 1958. CAN. 0564954.

2,955,938.—XEROGRAPHY - CHARGING PHOTOCONDUCTOR IN INSULATING. OCT. 11, 1960. CAN. 0603124.

3,307,034.—TWO-WIRE CORONA DISCHARGE SYSTEM FOR SINGLE-STEP ELECTROSTATIC IMAGE FORMATION. FEB. 28, 1967. CAN. 0768802, FRA. 1416275, GER. 1275864, GRB. 1055416, ITL. 0744235, JAP. 0491997.

3,453,427.—ELEC LAMP FOR UNIFRMLY CHRGNG THE PHOTOCNDCTIVE INSULATNG LAYER OF A XEROGRAPHIC PLATE. JULY 1, 1969.

3,481,669.—PHOTO-CHARGING OF XEROGRAPHIC PLATES. DEC. 2, 1969. AUS. 0420860, BEL. 0705167, CAN. 0814631, FRA. 1541297, GER. 1522683, GRB. 1088073, JAP. 0517512.

3,687,538.—APPARATUS FOR EXPOSING LATENT IMAGE MARGINS IN ELECTROPHOTOGRAPHIC COPYING APPARATUS. AUG. 29, 1972.

3,751,155.—PRE-DEVELOPMENT EXPOSURE ASSEMBLY. AUG. 7, 1973.

3,809,472.—PRE-DEVELOPMENT EXPOSURE ASSEMBLY. MAY 7, 1974. ARG. 0196103, AUS. 0466757, BEL. 0793559, CHL. 0027991, FRA. 7246234, GRB. 1415170, ITL. 0973319, JAP. 0552841, MEX. 0131207, NZL. 0169421, PRU. 0013334, PTG. 0058769, SAF. 0729132, SPN. 0410172, STZ. 0552841, SWD. 7216970.

3,845,307.—COMBINED CORONA AND LUMINESCENT DISCHARGE. OCT. 29, 1974. BEL. 0811310, GRB. 1433663.

3,860,338.—ADJUSTABLE FADEOUT. JAN. 14, 1975. BEL. 0809655.

3,893,419.—BACKGROUND REDUCTION TECHNIQUE. JULY 8, 1975.

3,984,842.—DEVICE FOR CONTINOUS ELECTROSTATIC REPRODUCTION OF AN OPTICAL IMAGE. OCT. 5, 1976.

3,994,000.—DEVICE FOR ELECTROSTATOGRAPHIC REPRODUCTION OF AN OPTICAL IMAGE USING A CHARGE STORAGE GRID. NOV. 23, 1976.

4,005,438.—DEVICE WITH CONTROL GRID FOR ELECTROSTATOGRAPHIC REPRODUCTION OF AN OPTICAL IMAGE. JAN. 25, 1977.

Class 4A

3,811,764.—APPARATUS FOR PHOTOELECTROPHORETIC IMAGING USING A PERIODIC ELECTRIC FIELD. MAY 21, 1974.

Class 4A 1

2,781,704.—XEROGRAPHIC COPIER CAMERA UNIT. FEB. 19, 1957. CAN. 0581458.

2,808,023.—APPARATUS FOR DEVELOPING ELECTROSTATIC LATENT IMAGE. OCT. 1, 1957.

2,812,883.—ELECTROPHOTOGRAPHIC DEVELOPING POWDER CLOUD GENERATING PROCESS AND APPARATUS. NOV. 12, 1957.

3,330,180.—ILLUMINATION CONTROL SYSTEM. JULY 11, 1967. ARG. 0151653, BRA. 0084295, CAN. 0785137, FRA. 1450157, GER. 1264239, GRB. 1122629, ITL. 0730678, JAP. 0508404, MEX. 0078870.

3,432,231.—EXPOSURE CONTROL DEVICE. MAR. 11, 1969.

3,432,232.—ILLUMINATION SYSTEM. MAR. 11, 1969. CAN. 0846423, JAP. 0534763.

3,487,252.—CESIUM LIGHT SOURCE. DEC. 30, 1969.

3,504,969.—IMAGING APPARATUS. APR. 7, 1970.

3,512,886.—DUAL CARRIAGE SCANNING SYS. MAY 19, 1970. CAN. 0875712, GRB. 1235136.

3,586,849.—ILLUMINATION SYSTEM. JUNE 22, 1971. ARG. 0183139, ATR. 0303522, AUS. 0428629, BEL. 0733400, BRA. 6908480, CAN. 0903730, CHL. 0024870, FRA. 6917011, GRB. 1260688, ITL. 0864185, MEX. 0111515, NOR. 0125954, NZL. 0156507, PNM. 0001430, PRU. 0010320, PTG. 0051752, SAF. 0693689, SPN. 0367616, STZ. 0758269, SWD. 0354924, VZL. 0025067.

3,622,217.—LIGHT PRODUCING SYSTEM. NOV. 23, 1971.

3,733,599.—TRIGGERING APPARATUS FOR A FLASH LAMP. MAY 15, 1973. CAN. 0937281, GRB. 1361073.

3,746,442.—ELECTROPHOTOGRAPHIC IMAGING APPARATUS. JULY 17, 1973.

3,767,956.—APERTURE FLUORESCENT LAMP FOR COPYING MACHINES. OCT. 23, 1973.

3,777,135.—ILLUMINATION SYSTEM. DEC. 4, 1973.

3,779,640.—HEATING APPARATUS FOR SCAN LAMP. DEC. 18, 1973. ITL. 09[illegible].677.

3,781,585.—LIGHT PRODUCING SYSTEM. DEC. 25, 1973.

3,824,013.—LIGHT SOURCE ALIGNMENT DEVICE. JULY 16, 1974.

3,851,201.—LAMP ASSEMBLY. NOV. 26, 1974.

3,868,182.—LAMP ASSEMBLY. FEB. 25, 1975.

3,869,205.—ILLUMINATION SOURCE FOR XEROGRAPHIC EXPOSURE. MAR. 4, 1975.

3,881,817.—OPTICAL ALIGNMENT SYSTEM FOR AN ORIGINAL DOCUMENT. MAY 6, 1975. CAN. 3881817.

3,893,754.—COMBINATION PARABOLOID-ELLIPSOID MIRROR SYSTEM. JULY 8, 1975.

3,904,290.—OPTICAL SYSTEM ALIGNMENT APPARATUS. SEPT. 9, 1975.

3,909,254.—LASER RECORDING METHOD. SEPT. 30, 1975.

3,914,649.—PULSED METAL OR METAL HALIDE LAMPS FOR PHOTOCOPYING APPLICATIONS. OCT. 21, 1975.

3,961,222.—SODIUM VAPOR LAMP CONFIGURATION. JUNE 1, 1976.

3,967,893.—AN ILLUMINATING APPARATUS. JULY 6, 1976.

3,983,441.—MULTIPLE PINCH INCANDESCENT LAMP. SEPT. 28, 1976.

3,992,108.—OPTICAL SYSTEM ALIGNMENT APPARATUS. NOV. 16, 1976.

3,998,539.—AN ILLUMINATION SYSTEM. DEC. 21, 1976.

4,005,332.—EFFICIENT DC OPERATED FLUORESCENT LAMPS. JAN. 25, 1977.

4,005,940.—OPTICAL SYSTEM ALIGNMENT APPARATUS. FEB. 1, 1977.

Class 4A 2

2,738,705.—FILE-HOLDING DEVICE FOR CAMERA COPY SUPPORT. MAR. 20, 1956.

2,758,503.—COPY-HOLDING APPARATUS. AUG. 14, 1956.

3,381,573.—SCANNING ATTACHMENT. MAY 7, 1968. CAN. 0820036, GER. 1945460, GRB. 1134645, JAP. 0524529.

3,524,704.—MULTI-LENGTH DOCUMENT RECORDING APPARATUS. AUG. 18, 1970.

3,888,581.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.

3,888,582.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.

3,888,584.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.

3,888,585.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.

3,901,594.—SEMI-AUTOMATIC DOCUMENT HANDLER. AUG. 26, 1975.

3,930,724.—MASKING APPARATUS FOR A MULTI-COLOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. JAN. 6, 1976.

Class 4A 2A

3,062,110.—EXPOSURE STATION APPARATUS. NOV. 6, 1962. CAN. 0701636, JAP. 0318676.

3,560,089.—PLATEN COVER. FEB. 2, 1971. BEL. 0736415, CAN. 0910104, FRA. 0024759, GRB. 1245543, ITL. 8691460, JAP. 0674392.

3,560,090.—PLATEN COVER. FEB. 2, 1971. CAN. 0910103.

3,615,134.—COUNTERBALANCED AND SELF-CLOSING PLATEN COVER. OCT. 26, 1971. ARG. 0185533, AUS. 0449673, BEL. 0756482, CAN. 0921744, CHL. 0025836, EGR. 0084323, FRA. 7035445, GRB. 1318753, GUA. 0002610, ITL. 0908279, MEX. 0116804, PLD. P143518, PNM. 0002181, SPN. 0384046, STZ. 0515525, TIW. 0006830, USR. 0439097.

3,642,371.—PLATEN COVER FOR COPYING MACHINE. FEB. 15, 1972. ARG. 0189873, BEL. 0768991, CAN. 0938485, FRA. 7124554, ITL. 0932443.

3,642,376.—REMOVABLE PLATEN COVER. FEB. 15, 1972. CAN. 0926919.

3,685,905.—COMBINED DOCUMENT FEED AND BOOK COPYING APPARATUS. AUG. 22, 1972. ARG. 0189167, BEL. 0782370, CAN. 0954579, FRA. 7214327, GRB. 1382646, ITL. 0959701, MEX. 0127002, VZL. 30688.
3,788,737.—LUMINESCENT COVER. JAN. 29, 1974. FRA. 7336535.
3,813,161.—PLATEN COVER. MAY 28, 1974.
3,860,338.—ADJUSTABLE FADEOUT. JAN. 14, 1975. BEL. 0809655.
3,914,043.—COLOR ACCENTING COPYING MACHINE. OCT. 21, 1975.
3,914,049.—OPTICAL SCANNING SYSTEM. OCT. 21, 1975. BEL. 0815416.
3,930,466.—SEGMENTED GATE DEVELOPER FLOW CONTROLLER. JAN. 6, 1976.
3,936,172.—LIQUID CRYSTALLINE PLATEN FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. FEB. 3, 1976.
3,997,265.—PLATEN COVER. DEC. 14, 1976.

Class 4A 3

3,432,232.—ILLUMINATION SYSTEM. MAR. 11, 1969. CAN. 0846423, JAP. 0534763.
3,600,610.—TIME DELAY CIRCUIT FOR A RADIANT ENERGY PROTECTIVE APPARATUS. AUG. 17, 1971.
3,672,759.—ILLUMINATION CONTROL SYSTEM. JUNE 27, 1972.
3,775,008.—OPTICAL SCANNING APPARATUS. NOV. 27, 1973.
3,829,209.—IMAGE REGISTRATION IN A MULTIPLE MAGNIFICATION PHOTOCOPY INH SYSTEM. AUG. 13, 1974. ARG. 0194481, BEL. 0784522, CAN. 0988146, FRA. 7220688, GRB. 1397446, ITL. 0956415, MEX. 0128160, SPN. 403.700, STZ. 0563605, SWD. 7207535.
3,926,518.—OPTICAL SCANNING SYSTEM. DEC. 16, 1975.
3,947,117.—EXPOSURE CONTROL SYSTEM. MAR. 30, 1976.
3,975,289.—CHARGE TRANSFER COMPLEXE OF FERRONCENES HAVING LIGHT FILLING PROPERTIES. AUG. 17, 1976.
3,995,954.—EXPOSURE SYSTEM. DEC. 7, 1976.
4,025,541.—CHARGE TRANSFER OF FERROCENES HAVING LIGHT FILTERING PROPERTIES. MAY 24, 1977.

Class 4B

2,689,179.—XEROGRAPHIC CONTACT COPYING DEVICE. SEPT. 14, 1954.
3,912,387.—ELECTROSTATOGRAPHY. OCT. 14, 1975.
3,967,894.—A SCREENED OPTICAL SYSTEM. JULY 6, 1976.
3,967,895.—ILLUMINATION CONTROL SYSTEM. JULY 6, 1976.
3,981,577.—AN OPTICAL SYSTEM FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. SEPT. 21, 1976.
3,994,723.—ELECTROPHOTOGRAPHIC PROCESS INVOLVING STEP OF SUBSEQUENT DISCHARGE OF AREAS RECEIVING INSUFFICIENT. NOV. 30, 1976.

Class 4B 1

2,583,546.—ELECTROPHOTOGRAPHIC RECORDING. JAN. 29, 1952.
3,062,094.—ELECTROPHOTOGRAPHIC COPYING APPARATUS. NOV. 6, 1962. JAP. 0286655.
3,062,095.—PROJECTOR OPTICAL SCANNING SYSTEM. NOV. 6, 1962. CAN. 0706050.
3,062,108.—ELECTROPHOTOGRAPHIC COPYING APPARATUS. NOV. 6, 1962.
3,076,392.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 5, 1963. CAN. 0689623, FRA. 1271754, GER. 1209418, GRB. 0962654.
3,137,202.—OPTICAL SCANNING APPARATUS FOR XEROGRAPHIC PRINTERS. JUNE 16, 1964. CAN. 0685880.
3,221,622.—OPTICAL SCANNING SYSTEM. DEC. 7, 1965. ADN. 0000471, ARG. 0150818, ATR. 0267325, AUS. 0402541, BEL. 0657557, BRS. 00J3737, BRU. 0000469, CAN. 0756354, EIR. 0028649, FIJ. 0000342, FIN. 0045258, FRA. 1420763, GER. 1497089, GHA. 0000994, GIB. 1089536, GIE. 0006969, GRB. 1089536, GRK. 0029663, GUR. 1089536, HGK. 0009169, HOL. 0146615, ISR. 0022618, ITL. 0742392, JAP. 0599246, JER. 0000P96, KEN. 0001744, LXB. 0047657, MAU. 1927571, MLS. 0015069, NIG. 0001619, NOR. 0118726, NZL. 0140371, PTG. 0043364, SAF. 0646113, SBH. 0005269, SGP. 0008269, SHL. 0000017, SLN. 2677286, SPN. 0307501, SRK. 0000389, STZ. 0450920, SWD. 0338716, UGD. 0000269.
3,318,186.—OPTICAL SYSTEM FOR REPRODUCTION MACHINES. MAY 9, 1967. CAN. 0798356, FRA. 1467332, GRB. 1139231, ITL. 0758313, JAP. 0512656, MEX. 0085288, SWD. 6912062.
3,381,573.—SCANNING ATTACHMENT. MAY 7, 1968. CAN. 0820036, GER. 1945460, GRB. 1134645, JAP. 0524529.
3,405,564.—PULLEY. OCT. 15, 1968. CAN. 0850353.
3,454,335.—SCANNING SYSTEM. JULY 8, 1969. BEL. 0708647, CAN. 0853453, FRA. 1549127, GRB. 1207850, ITL. 0819656, JAP. 0591210.
3,484,163.—SCANNING SYSTEM. DEC. 16, 1969. CAN. 0840630.
3,504,969.—IMAGING APPARATUS. APR. 7, 1970.
3,512,886.—DUAL CARRIAGE SCANNING SYS. MAY 19, 1970. CAN. 0875712, GRB. 1235136.
3,523,725.—XEROGRAPHIC REPRODUCING APPARATUS. AUG. 11, 1970. CAN. 0917730, GRB. 1271862.
3,532,425.—GRAPHIC DISTORTION APPARATUS. OCT. 6, 1970.
3,552,221.—SPEED CONVERTING MECHANISM. JAN. 5, 1971.
3,591,277.—XEROGRAPHIC REPRODUCING APPARATUS. JULY 6, 1971. AUS. 0428584, BEL. 0723949, CAN. 0869628, CZC. 0157352, FRA. 1591801, GER. 0989774, GRB. 1223429, ITL. 0856815, SWD. 0348060, USR. 0465805.
3,612,679.—SCANNING APPARATUS. OCT. 12, 1971. GRB. 1307918.
3,671,237.—METHOD FOR PRODUCING IMAGES. JUNE 20, 1972. CAN. 0886492, GRB. 1317043.
3,794,418.—IMAGING SYSTEM. FEB. 26, 1974.
3,832,057.—SCANNING APPARATUS. AUG. 27, 1974. GRB. 1417255.
3,858,976.—OPTICAL SCANNING SYSTEM. JAN. 7, 1975.
3,869,204.—SCANNING OPTICAL SYSTEM. MAR. 4, 1975. BEL. 0815215.
3,905,247.—CLUTCHES. SEPT. 16, 1975.
3,918,806.—DASHPOT FOR COPIER OPTICAL SCANNING. NOV. 11, 1975.
3,936,173.—OPTICAL SYSTEM. FEB. 3, 1976.
3,948,374.—CLUTCHES. APR. 6, 1976.
3,950,091.—APPARATUS FOR CONTROLLING MOVEMENT OF A CARRIAGE. APR. 13, 1976.
3,973,825.—FLAT FIELD SCANNING SYSTEM. AUG. 10, 1976. BEL. 0836735.
3,989,369.—SCANNING MECHANISM FOR A COPYING APPARATUS. NOV. 2, 1976.
4,027,961.—COPIER/RASTER SCAN APPARATUS. JUNE 7, 1977.
4,032,231.—MULTIPLE RANGE VARIABLE MAGNIFICATION REPRODUCTION MACHINE USING THREE-DIMENSIONAL CAM. JUNE 28, 1977. BEL. 0843419.

Class 4B 1A

3,139,013.—DOCUMENT REPRODUCING APPARATUS. JUNE 30, 1964. CAN. 0727819, FRA. 1346596, GRB. 1016265, JAP. 0442652.
3,330,190.—PRINTING APPARATUS. JULY 11, 1967. CAN. 0758791, GER. 1280282, GRB. 1102419, JAP. 0529726.
3,438,704.—ILLUMINATION CONTROL SYSTEM. APR. 15, 1969. CAN. 0865838, GRB. 1209473, JAP. 1002842.
3,485,546.—FIELD FLATTENER SCANNING MEANS. DEC. 23, 1969. CAN. 0850916, GRB. 1196373, JAP. 0667705.
3,504,960.—SAGITTAL RAY APERTURE STOP. APR. 7, 1970. AUS. 0413558, BEL. 0704924, CAN. 0849815, FRA. 1540700, GRB. 1209472, ITL. 0814606, JAP. 0972613.
3,524,704.—MULTI-LENGTH DOCUMENT RECORDING APPARATUS. AUG. 18, 1970.
3,542,467.—XEROGRAPHIC REPRODUCING APPARATUS. NOV. 24, 1970. ARG. 0180116, AUS. 0442029, BEL. 0731552, BRA. 6908056, CAN. 0877451, FRA. 6911558, GRB. 1257103, ITL. 0857659, JAP. 0668806, MEX. 0108892, SPN. 0366056, SWD. 0346397, VZL. 0023746.
3,592,531.—SPLIT DAGOR-TYPE OF SYMMETRICAL COPYING LENS SYSTEM. JULY 13, 1971. CAN. 0929389.
3,640,615.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 8, 1972. ARG. 0174792, AUS. 0428440, BEL. 0723948, CAN. 0884439, FRA. 1596660, GRB. 1223428, ITL. 0847541, JAP. 0992414, MEX.. 0108966, PNM. 0001806, SPN. 0360210, SWD. 0352456, VZL. 0023711.
3,652,157.—MICROFILM PROJECTION APPARATUS. MAR. 28, 1972. CAN. 0937797, GRB. 1324097.
3,655,284.—LONGITUDINALLY INSENSITIVE LENS STRIP IMAGING DEVICE. APR. 11, 1972.
3,670,633.—RECORDING APPARATUS. JUNE 20, 1972.

3,778,147.—ELECTROSTATIC REPRODUCTION MACHINE HAVING SLEECTSBLE MAGNIFICATIONRATIOS. DEC. 11, 1973. CAN. 989464.
3,788,740.—IMAGING SYSTEM. JAN. 29, 1974.
3,975,289.—CHARGE TRANSFER COMPLEXEX OF FERRONCENES HAVING LIGHT FILLING PROPERTIES. AUG. 17, 1976.
3,994,580.—OPTICAL SYSTEM FOR SCANNING DURING RECIPROCAL MOTION. NOV. 30, 1976.
4,008,958.—OPTICAL SYSTEM FOR EFFECTED IMAGE ROTATION. FEB. 22, 1977.
4,025,541.—CHARGE TRANSFER OF FERROCENES HAVING LIGHT FILTERING PROPERTIES. MAY 24, 1977.
4,029,409.—MULTI-MODE OPTICAL SCANNING SYSTEM. JUNE 14, 1977. BEL. 0843153, HAT. 0001524.

Class 4B 1A 1

3,544,190.—LENS STRIP OPTICAL SCANNING SYSTEM. DEC. 1, 1970. CAN. 0904070, GRB. 1278336.
3,584,950.—LENS STRIP OPTICAL SCANNING SYSTEM. JUNE 15, 1971.
3,584,952.—LENS STRIP OPTICAL SCANNING SYSTEM - REISSUED D 2074R. JUNE 15, 1971.
3,584,953.—SHORT FOCAL OPTICAL LENGTH SCANNING SYSTEM. JUNE 15, 1971.
3,650,621.—OPTICAL IMAGING SYSTEM. MAR. 21, 1972. BEL. 0747978, CAN. 0927470, FRA. 7011548, GRB. 1297907, ITL. 0898936, JAP. 0731225.
3,881,369.—BI-AXIAL POSITIONER. MAY 6, 1975.
3,912,392.—SHORT FOCAL LENGTH OPTICAL SCANNING SYSTEM. OCT. 14, 1975.

Class 4B 1A 2

3,496,846.—SCRIPTWRITER USING FIBER OPTIC BUNDLE. FEB. 24, 1970.
3,560,085.—APPARATUS FOR GRAPHIC DISTORATION. FEB. 2, 1971.
3,681,777.—RECORDING APPARATUS. AUG. 1, 1972.

Class 4B 1A 3

3,120,790.—XEROGRAPHIC EXPOSURE APPARATUS. FEB. 11, 1964. AUS. 0270483, FRA. 1333280, GER. 1204066, GRB. 1019291, ITL. 0674895, JAP. 0468454.
3,497,296.—XEROGRAPHIC EXPOSURE APPARATUS. FEB. 24, 1970.
3,535,036.—APPARATUS FOR FORMING HALF-TONE LINE SCREEN WITH A LENS. OCT. 20, 1970. CAN. 0909309, GRB. 1253887.
3,540,806.—HALF TONING METH AND APPARATUS FOR SOLID AREA COVERAG. NOV. 17, 1970. CAN. 0892754, GRB. 1253888.
3,580,671.—EXPOSURE APPARATUS. MAY 25, 1971. CAN. 0912104, GRB. 1276010.
3,905,822.—COMPOUND SCREEN FOR OBJECT SCREENING. SEPT. 16, 1975.
3,912,510.—ELECTROPHOTOGRAPHIC PROCESS EMPLOYING A COMPOUND DOCUMENT SCREEN. OCT. 14, 1975.
3,914,040.—REVERSIBLE SCREEN FOR ELECTROPHOTOGRAPHIC PRINTING. OCT. 21, 1975.
3,958,877.—HALF-TONE SCREEN WITH CLEANING MEANS FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. MAY 25, 1976.
3,961,847.—AN ARCUATE SCREEN FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 8, 1976.
3,961,848.—AN ELECTROPHOTOGRAPHIC PRINTING MACHINE WITH HALFTONE SCREEN CLEANING. JUNE 8, 1976.
3,963,342.—CURVED SCREEN. JUNE 15, 1976.
3,973,953.—IMAGING METHOD INCLUDING EXPOSURE OF PHOTOCONDUCTIVE IMAGING MEMBER THROUGH LENTICULAR LENS ELE. AUG. 10, 1976. STZ. 0557051.
3,973,954.—IMAGING METHOD INCLUDING EXPOSURE OF PHOTOCONDUCTIVE IMAGING MEMBER THROUGH LENTICULAR LENS ELE. AUG. 10, 1976. STZ. 0557051.
3,973,957.—IMAGING METHOD INCLUDING EXPOSURE OF DEFORMATION IMAGING MEMBER THROUGH LENTICULAR LENS ELEMENT. AUG. 10, 1976.
3,973,958.—IMAGING METHOD INCLUDING EXPOSURE OF DEFORMATION IMAGING MEMBER THROUGH LENTICULAR ELEMENT. AUG. 10, 1976.
4,003,649.—ELECTROPHOTOGRAPHIC HALFTONE PRINTING MACHINE EMPLOYING A PHASE SCREEN. JAN. 18, 1977.
4,007,981.—DUAL MODE ELECTROSTATOGRAPHIC PRINTING MACHINE. FEB. 15, 1977.
4,012,137.—AN OPTICAL SYSTEM HAVING A ROTATING SCREEN. MAR. 15, 1977.
4,013,355.—NOTCH FILTER FOR COLOR TRANSPARENCY COPYING MACHINES. MAR. 22, 1977.
4,014,030.—HALF-TONE IMAGING WITH FLYING SPOT SCANNER SYSTEM. MAR. 22, 1977.
4,014,607.—REMOVABLE SCREENING SYSTEM FOR A TRANSPARENCY REPRODUCTION MACHINE. MAR. 29, 1977.
4,025,181.—A SCREEN CLEANING DEVICE. MAY 24, 1977.
4,035,070.—APPARATUS AND METHOD FOR OPTICAL GENERATION OF A STRUCTURED CHARGE-DISCHARGE PATTERN ON A PHOTO. JULY 12, 1977.

Class 4B 1A 4

3,424,525.—MICROFILM COPIER ATTACHMENT. JAN. 28, 1969.
3,542,468.—MICROFILM ENLARGER-COPIER - MICROFILM ATTACHMENT. NOV. 24, 1970. CAN. 0858250.
3,547,533.—MICROFILM REPRODUCTION MACHINE. DEC. 15, 1970. BEL. 0689227, CAN. 0891072, FRA. 1498788, GRB. 1160904, ITL. 0794772, MEX. 0095144.

Class 4B 2

3,220,324.—PHOTOCONDUCTIVELY CONTROLLED CORONA CHARGING. NOV. 30, 1965. CAN. 0710976, GER. 1243967, GRB. 1034009, JAP. 0651092.
3,254,998.—INDUCTION IMAGE FORMATION. JUNE 7, 1966. CAN. 0740576, FRA. 1357220, GER. 1276445, GRB. 1024985, JAP. 0451689.
3,307,034.—TWO-WIRE CORONA DISCHARGE SYSTEM FOR SINGLE-STEP ELECTROSTATIC IMAGE FORMATION. FEB. 28, 1967. CAN. 0768802, FRA. 1416275, GER. 1275864, GRB. 1055416, ITL. 0744235, JAP. 0491997.
3,394,002.—CHARGE TRANSFER WITH LIQUID LAYERS. JULY 23, 1968. CAN. 0840028, GRB. 1126048, JAP. 0524527.
3,698,807.—DISPLAYING AND PRINTING APPARATUS. OCT. 17, 1972. CAN. 0963521, GRB. 1376814.

Class 4B 3

3,283,651.—INFORMATION ENCODING DEVICE. NOV. 8, 1966. CAN. 0859923, GRB. 1096645, JAP. 0547197.
3,532,425.—GRAPHIC DISTORTION APPARATUS. OCT. 6, 1970.
3,560,085.—APPARATUS FOR GRAPHIC DISTORATION. FEB. 2, 1971.
3,584,950.—LENS STRIP OPTICAL SCANNING SYSTEM. JUNE 15, 1971.
3,584,953.—SHORT FOCAL OPTICAL LENGTH SCANNING SYSTEM. JUNE 15, 1971.
3,725,059.—METHOD OF CLEANING AN ELECTROSTATOGRAPHIC SURFACE. APR. 3, 1973. GRB. 1337282.
3,862,801.—METHOD OF CLEANING AN ELECTROSTATOGRAPHIC IMAGING SURFACE. JAN. 28, 1975. GRB. 1337282.

Class 4B 4

2,781,704.—XEROGRAPHIC COPIER CAMERA UNIT. FEB. 19, 1957. CAN. 0581458.
2,962,374.—COLOR XEROGRAPHY. NOV. 29, 1960.
2,965,483.—XEROGRAPHIC CONTRAST. DEC. 20, 1960. CAN. 0616969.
3,283,651.—INFORMATION ENCODING DEVICE. NOV. 8, 1966. CAN. 0859923, GRB. 1096645, JAP. 0547197.
3,432,231.—EXPOSURE CONTROL DEVICE. MAR. 11, 1969.
3,473,455.—EXPOSURE REGISTRATION APPARATUS. OCT. 21, 1969.
3,521,950.—XEROGRAPHIC REPRODUCING APPARATUS. JULY 28, 1970. ARG. 0184148, ATR. 0317675, AUS. 0441739, BEL. 0713876, CAN. 0877511, CHL. 0024535, DNK. 0129304, FRA. 1558225, GRB. 1231622, GRK. 0037839, IND. 0124668, ISR. 0029824, ITL. 0831700, JAM. 0001853, JAP. 0774498, LXB. 0055912, MEX. 0102085, NOR. 0131313, NZL. 0159801, PRU. 0009366, PTG. 0049474, SAF. 68/2518, SPN. 0352885, STZ. 0505015, SWD. 7012263, UAR. 0008668, URG. 0009239, VZL. 0025077.

3,586,849.—ILLUMINATION SYSTEM. JUNE 22, 1971. ARG. 0183139, ATR. 0303522, AUS. 0428629, BEL. 0733400, BRA. 6908480, CAN. 0903730, CHL. 0024870, FRA. 6917011, GRB. 1260688, ITL. 0864185, MEX. 0111515, NOR. 0125954, NZL. 0156507, PNM. 0001430, PRU. 0010320, PTG. 0051752, SAF. 0693689, SPN. 0367616, STZ. 0758269, SWD. 0354924, VZL. 0025067.
3,697,160.—CONTINUOUS IMAGING APPARATUS. OCT. 10, 1972.
3,995,950.—EXPOSURE SYSTEM FOR ELECTROSTATIC MACHINES. DEC. 7, 1976.

Class 4B 5

3,094,910.—REFLEX XEROGRAPHIC APPARATUS. JUNE 25, 1963. CAN. 0704293, GRB. 0997415.
3,212,417.—REFLEX EXPOSURE SYSTEM. OCT. 19, 1965. CAN. 0733682, GRB. 1052783, JAP. 0487026.
3,278,302.—PHOSPHORESCENT SCREEN REFLEX. OCT. 11, 1966. CAN. 0748828.

Class 4B 6

3,076,392.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 5, 1963. CAN. 0689623, FRA. 1271754, GER. 1209418, GRB. 0962654.
3,355,236.—AUTOMATIC OPTICAL CONTROL APPARATUS. NOV. 28, 1967. CAN. 0771917.
3,542,467.—XEROGRAPHIC REPRODUCING APPARATUS. NOV. 24, 1970. ARG. 0180116, AUS. 0442029, BEL. 0731552, BRA. 6908056, CAN. 0877451, FRA. 6911558, GRB. 1257103, ITL. 0857659, JAP. 0668806, MEX. 0108892, SPN. 0366056, SWD. 0346397, VZL. 0023746.
3,765,027.—ION LENS RECORDING SYSTEM. OCT. 9, 1973.
3,848,996.—PHOTOCOMPOSING APPARATUS. NOV. 19, 1974. BEL. 0815043.
3,901,585.—ZOOM LENS ASSEMBLY. AUG. 26, 1975. GRB. 1443481.
3,909,103.—LENS SCAN MECHANISM. SEPT. 30, 1975.
3,947,188.—VARIABLE CONJUGATE OPTICAL SYSTEM. MAR. 30, 1976.
3,967,896.—VARIABLE EDGE FADEOUT APP FOR ELECTROSTATIC REPRODUCTION MACHINE. JULY 6, 1976.
3,998,540.—REPOSITIONING SYSTEM FOR VIEWING AND PROJECTION ELEMENTS OF A REPRODUCING APPARATUS. DEC. 21, 1976.
4,013,361.—OPTICAL APP AND REPRODUCING MACHINE. MAR. 22, 1977. BEL. 0843158.
4,027,963.—MULTI-MODE REPRODUCING APPARATUS. JUNE 7, 1977. BEL. 0843154, HAT. 0001534.
4,029,411.—VARIABLE MAGNIFICATION COPIER. JUNE 14, 1977. BEL. 0839792, SPN. 0445641.
4,033,691.—VARIABLE MAGNIFICATION REPRODUCING APPARATUS. JULY 5, 1977.
4,033,692.—MULTI-MODE REPRODUCING MACHINE. JULY 5, 1977. HAT. 0001504.

Class 4B 6A

3,318,186.—OPTICAL SYSTEM FOR REPRODUCTION MACHINES. MAY 9, 1967. CAN. 0798056, FRA. 1467332, GRB. 1139231, ITL. 0758313, JAP. 0512656, MEX. 0085288, SWD. 6912062.
3,454,335.—SCANNING SYSTEM. JULY 8, 1969. BEL. 0708647, CAN. 0853453, FRA. 1549127, GRB. 1207850, ITL. 0819656, JAP. 0591210.
3,476,478.—APPARATUS FOR CHANGING MAGNIFICATION OF PHOTOCOPIER W/O CHANGING CONJUGATE LENGTH OF OPTICAL SY. NOV. 4, 1969. ARG. 0172460, AUS. 0415808, BEL. 0708650, BRA. 6795668, CAN. 0845405, FRA. 1552364, GER. 1297981, GRB. 1223427, ITL. 0821929, MEX. 0100019, VZL. 0023689.
3,510,219.—OPTICAL ALIGNMENT SYSTEM. MAY 5, 1970. ARG. 0172455, BRA. 6793791, CAN. 0881018, CHL. 0023570, GRB. 1206966, MEX. 0101166, PRU. 0009329, SPN. 0360896, STZ. 0501233, SWD. 0359168, URG. 0008831, VZL. 0025783.
3,521,950.—XEROGRAPHIC REPRODUCING APPARATUS. JULY 28, 1970. ARG. 0184148, ATR. 0317675, AUS. 0441739, BEL. 0713876, CAN. 0877511, CHL. 0024535, DNK. 0129304, FRA. 1558225, GRB. 1231622, GRK. 0037839, IND. 0124668, ISR. 0029824, ITL. 0831700, JAM. 0001853, JAP. 0774498, LXB. 0055912, MEX. 0102085, NOR. 0131313, NZL. 0159801, PRU. 0009366, PTG. 0049474, SAF. 68/2518, SPN. 0352885, STZ. 0505015, SWD. 7012263, UAR. 0008668, URG. 0009239, VZL. 0025077.
3,524,704.—MULTI-LENGTH DOCUMENT RECORDING APPARATUS. AUG. 18, 1970.
3,591,256.—VARIABLE MAGNIFICATION LENS SYSTEM. JULY 6, 1971. BEL. 0731553, CAN. 0881019, FRA. 6911559, GRB. 1234515, ITL. 0857660.
3,591,277.—XEROGRAPHIC REPRODUCING APPARATUS. JULY 6, 1971. AUS. 0428584, BEL. 0723949, CAN. 0869628, CZC. 0157052, FRA. 1591801, GER. 0989774, GRB. 1223429, ITL. 0856815, SWD. 0348060, USR. 0465805.
3,600,066.—OPTICAL ASSEMBLY WITH SUPPLEMENTAL LENS MEANS. AUG. 17, 1971. CAN. 0943792, GRB. 1261159, JAP. 0728824.
3,817,599.—PROJECTION LENS WITH ADD LENS ELEMENTS. JUNE 18, 1974.
3,912,374.—SIX COMPONENT ZOOM LENS. OCT. 14, 1975.

Class 4B 7

3,470,797.—DISPLAY DEVICE. OCT. 7, 1969.
3,472,136.—CHARACTER GENERATOR. OCT. 14, 1969. CAN. 0884500, GRB. 1191881.
3,473,455.—EXPOSURE REGISTRATION APPARATUS. OCT. 21, 1969.
3,523,725.—XEROGRAPHIC REPRODUCING APPARATUS. AUG. 11, 1970. CAN. 0917730, GRB. 1271862.
3,615,132.—METHOD OF PRINTING MULTIPLE COPIES OF COMPOSITE INFORMATION ON STANDARD SIZE COPY SHEETS. OCT. 26, 1971.
3,620,618.—MULTIPLE INPUT COPYING APPARATUS. NOV. 16, 1971.
3,775,007.—FORMS REPRODUCTION APPARATUS. NOV. 27, 1973.
3,827,062.—OPTICAL ARRANGEMENT FOR HIGH SPEED PRINTOUT SYSTEM. JULY 30, 1974.

Class 4C

2,965,483.—XEROGRAPHIC CONTRAST. DEC. 20, 1960. CAN. 0616969.
3,188,208.—SPECTRAL CONTRAST CONTROL IN XEROGRAPHY. JUNE 8, 1965.
3,432,232.—ILLUMINATION SYSTEM. MAR. 11, 1969. CAN. 0846423, JAP. 0534763.
3,438,705.—AUTOMATIC XEROGRAPHIC DEVELOPMENT CONTROL. APR. 15, 1969. GRB. 1207830.
3,852,782.—IMAGING SYSTEM. DEC. 3, 1974.
3,901,189.—MAGNETIC BRUSH DEVELOPING APPARATUS. AUG. 26, 1975.
3,917,393.—VARIOSLIT. NOV. 4, 1975. BEL. 0820132.
3,970,382.—A SPATIALLY SELECTIVE OPTICAL SYSTEM. JULY 20, 1976. FRA. 7421348.
3,975,289.—CHARGE TRANSFER COMPLEXE OF FERRONCENES HAVING LIGHT FILLING PROPERTIES. AUG. 17, 1976.
3,997,259.—APPARATUS FOR REDUCING IMAGE BACKGROUND IN ELECTROSTATIC REPRODUCTION MACHINES. DEC. 14, 1976.
4,007,326.—ELECTRONIC COPY ANALYSIS. FEB. 8, 1977.
4,025,541.—CHARGE TRANSFER OF FERROCENES HAVING LIGHT FILTERING PROPERTIES. MAY 24, 1977.

Class 5

3,942,266.—METHOD AND APPARATUS FOR FIXING TONER IMAGES. MAR. 9, 1976.

Class 5A 1

2,221,776.—ELECTRON PHOTOGRAPHY. NOV. 19, 1940.
2,725,304.—PROCESS FOR DEVELOPING AN ELECTROSTATIC LATENT IMAGE. NOV. 29, 1955. CAN. 0557666.
2,792,971.—PARTICLE AEROSOL GENERATION. MAY 21, 1957.
2,815,330.—GENERATOR OF AEROSOL OF POWDER IN GAS. DEC. 3, 1957.
2,815,734.—APPARATUS FOR DEVELOPING XEROGRAPHIC IMAGE. DEC. 10, 1957.
2,859,127.—PROCESS FOR DEVELOPING ELECTROSTATIC IMAGES. NOV. 4, 1958. CAN. 0557667.
2,859,129.—PROCESS FOR DEVELOPING ELECTROSTATIC IMAGES AND APPARATUS THEREFOR. NOV. 4, 1958.
2,861,543.—APPARATUS FOR DEVELOPMENT OF ELECTROSTATIC IMAGE. NOV. 25, 1958. CAN. 0597655.
2,862,472.—ELECTROSTATIC IMAGE DEVELOPMENT APPARATUS. DEC. 2, 1958. CAN. 0619384, FRA. 1210178, GER. 1121473, GRB. 0895777, ITL. 0594503.
2,862,646.—POWDER PARTICLE AEROSOL GENERATOR. DEC. 2, 1958.

2,876,737.—APPARATUS FOR DEVELOPING ELECTROSTATIC IMAGES ON SHEET MATERIAL. MAR. 10, 1959.
2,878,972.—ROUGH SURFACE POWDER CLOUD GENERATION. MAR. 24, 1959.
2,943,950.—ELECTROSTATIC DEVELOPING APPARATUS AND METHOD. JULY 5, 1960. CAN. 0564395.
3,008,826.—XEROGRAPHIC DEVELOPMENT. NOV. 14, 1961.
3,094,248.—XEROGRAPHIC DEVELOPING APPARATUS. JUNE 18, 1963. CAN. 0678004, GRB. 0985306.
3,276,426.—CLOSED AEROSOL DEVELOPMENT. OCT. 4, 1966.
3,518,969.—DEVELOPMENT APPARATUS. JULY 7, 1970. CAN. 0852127, GRB. 1259879.
3,791,730.—APPARATUS FOR DEVELOPING ELECTROSTATIC LATENT IMAGES. FEB. 12, 1974.
3,795,443.—XEROGRAPHIC DEVELOPMENT. MAR. 5, 1974. GRB. 1255568, JAP. 0721852.

Class 5A 1A

2,824,545.—APPARATUS FOR DEVELOPING XEROGRAPHIC IMAGES. FEB. 25, 1958.
2,831,409.—XEROGRAPHIC CAMERA. APR. 22, 1958. CAN. 0575071.
3,060,131.—POWDER CLOUD GENERATING APPARATUS. OCT. 23, 1962.
3,129,113.—AUTOMATIC POWDER APPLICATOR APPARATUS. APR. 14, 1964.
3,640,246.—DEVELOPMENT APPARATUS FOR LATENT ELECTROSTATIC IMAGE. FEB. 8, 1972. ATR. 0319044, AUS. 0457007, BEL. 0758632, CAN. 0917404, FRA. 7042231, GRB. 1336741, ITL. 0909113, JAP. 0815548, SPN. 0385187, STZ. 0527453, SWD. 0363411, USR. 0505386.
3,646,910.—DEVELOPMENT APPARATUS FOR LATENT ELECTROSTATIC IMAGES. MAR. 7, 1972.
3,924,568.—APPARATUS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES. DEC. 9, 1975. BEL. 0809747, GRB. 1434673.
3,974,796.—DUAL MODE APPARATUS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES. AUG. 17, 1976.
4,033,292.—APPARATUS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES. JULY 5, 1977.

Class 5A 2

2,784,109.—METHOD FOR DEVELOPING ELECTROSTATIC IMAGES. MAR. 5, 1957. CAN. 0558593, GRB. 0698994.
2,811,135.—POWDER CHARGING DEVICE. OCT. 29, 1957.
2,873,721.—MICRO-MANIFOLD FOR POWDER CLOUD DEVELOPMENT. FEB. 17, 1959.
2,894,486.—APPARATUS FOR XEROGRAPHIC DEVELOPMENT. JULY 14, 1959.
3,160,524.—APPARATUS FOR CHARGING POWDER PARTICLES AND APPLYING THE CHARGED PARTICLES TO A RECEIVING MEMBER. DEC. 8, 1964. CAN. 0779861, GRB. 1026457.
3,257,223.—ELECTROSTATIC POWDER CLOUD XEROGRAPHIC DEVELOPMENT METHOD AND APPARATUS. JUNE 21, 1966. CAN. 0756559, GRB. 1028900, JAP. 0460474.
3,284,224.—CONTROLLED XEROGRAPHIC DEVELOPMENT. NOV. 8, 1966. CAN. 0751349, GRB. 1038801, JAP. 0640353.
3,357,403.—POWDER CLOUD DEVELOPMENT APPARATUS. DEC. 12, 1967.
3,470,009.—POWDER CLOUD DEVELOPMENT OF ELECTROSTATIC IMAGES. SEPT. 30, 1969. CAN. 0820240, FRA. 1461941, GRB. 1130452, HOL. 0142253, ITL. 0750148, JAP. 0512653, MEX. 0085176.
3,707,390.—METHOD FOR DEVELOPING ELECTROSTATIC LATENT IMAGES. DEC. 26, 1972.
3,767,446.—DEVELOPMENT METHOD WITH OSCILLATING BRUSH PAD. OCT. 23, 1973.

Class 5A 3

RE.28,183.—POWDER CLOUD. OCT. 1, 1974. ARG. 0119221, BEL. 0764300, CAN. 0939137, FRA. 7110037, GRB. 1351471, ITL. 0921294, MEX. 0119823, VZL. 0032790.
RE.28,193.—POWDER CLOUD XEROGRAPHIC DEVELOPMENT APPARATUS. OCT. 8, 1974. ARG. 0119221, BEL. 0764300, CAN. 0939137, FRA. 7110037, GRB. 1351471, ITL. 0921294, MEX. 0119823, VZL. 0032790.
2,842,456.—PROCESS FOR DEVELOPING AN ELECTROSTATIC IMAGE. JULY 8, 1958.
2,911,945.—APPARATUS FOR DEVELOPING ELECTROSTATIC IMAGES. NOV. 10, 1959.
2,914,221.—AEROSOL BOMB DEVELOPMENT. NOV. 24, 1959.
2,918,900.—APPARATUS FOR XEROGRAPHIC DEVELOPMENT. DEC. 29, 1959.
2,935,234.—POWDER CLOUD GENERATING APPARATUS. MAY 3, 1960. CAN. 0655160, GRB. 0957862.
2,965,069.—XEROGRAPHIC DEVELOPING APPARATUS. DEC. 20, 1960.
2,992,758.—POWDER CLOUD GENERATING APPARATUS. JULY 18, 1961. CAN. 0678816.
3,129,850.—POWDER CLOUD GENERATING APPARATUS. APR. 21, 1964. CAN. 0693933, GER. 1497044, GRB. 1001237, JAP. 0436042.
3,648,901.—POWDER CLOUD XEROGRAPHIC DVLMNT APP-REISSUED AS 28183 AND 28193 10/74. MAR. 14, 1972. ARG. 0119221, BEL. 0764300, CAN. 0939137, FRA. 7110037, GRB. 1351471, ITL. 0921294, MEX. 0119823, VZL. 0032790.
3,799,113.—HYBRID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGE. MAR. 26, 1974. CAN. 0980634, GRB. 1411708.

Class 5A 3A

2,832,511.—GENERATOR OF AN AEROSOL OF POWDER PARTICLES. APR. 29, 1958. CAN. 0705239, GER. 1170782, GRB. 0830780.
2,837,441.—XEROGRAPHIC WET BELT LOADING. JUNE 3, 1958.
2,843,084.—XEROGRAPHIC APPARATUS WITH ENDLESS DEVELOPMENT ELECTRODE. JULY 15, 1958.
2,843,295.—POWDER CLOUD GENERATOR. JULY 15, 1958.
2,859,128.—METHOD OF DEVELOPING XEROGRAPHIC IMAGE. NOV. 4, 1958. CAN. 0612193, FRA. 1148569, GER. 1063898.
3,060,131.—POWDER CLOUD GENERATING APPARATUS. OCT. 23, 1962.

Class 5A 3B

2,759,450.—XEROGRAPHIC DEVELOPING APPARATUS. AUG. 21, 1956. GRB. 0821337.
2,872,338.—ELECTROPHOTOGRAPHIC DEVELOPING PROCESS. FEB. 3, 1959.
2,877,132.—METHOD FOR DEVELOPMENT OF ELECTROSTATIC IMAGES. MAR. 10, 1959.
2,928,575.—ELECTROSTATIC IMAGE DEVELOPMENT. MAR. 15, 1960. CAN. 0634369.
3,599,604.—XEROGRAPHIC DEVELOPMENT APPARATUS. AUG. 17, 1971. ARG. 0187552, ATR. 0300574, AUS. 0427548, BEL. 0726572, BUL. 0017289, CAN. 0882577, DNK. 0122194, EGR. 0074431, EIR. 0032989, FRA. 1597322, GRB. 1248671, GRK. 0039920, IND. 0120485, ISR. 0031892, ITL. 0854007, LXB. 0058261, MEX. 0108936, NZL. 0155879, PAK. 0121035, PLP. 0006856, PNM. 0001804, PTG. 0051418, RHD. 1406967, RMN. 0054927, SAF. 0069181, SPN. 0362359, STZ. 0493015, UAR. 0009253, VTM. 0001857, VZL. 0023728.
3,633,544.—TURBO-CLOUD DEVELOPMENT. JAN. 11, 1972. CAN. 0934959, GRB. 1322363, JAP. 0741518.
3,670,701.—TWO STEP ORBITAL PAD DEVELOPMENT. JUNE 20, 1972. CAN. 0092849, GRB. 1313870, JAP. 0743834.
3,882,822.—APPARATUS FOR DEVELOPING ELECTROSTATIC LATENT IMAGE. MAY 13, 1975.

Class 5A 4

2,573,881.—METHOD AND APPARATUS FOR DEVELOPING ELECTROSTATIC IMAGES WITH ELECTROSCOPIC POWDER. NOV. 6, 1951. AUS. 0149247, CAN. 0479868, GER. 0903414, GRB. 0693905, STZ. 0286142, SWD. 0171735.
2,824,813.—METHOD FOR DEVELOPING ELECTROSTATIC LATENT IMAGES. FEB. 25, 1958.

Class 5A 5

2,965,136.—XEROGRAPHIC DEVELOPING APPARATUS. DEC. 20, 1960.
2,965,136.—XEROGRAPHIC DEVELOPING APPARATUS. DEC. 20, 1960.
3,345,293.—COLORED ELECTROSTATOGRAPHIC TONERS CONTAINING ORGANIC DYE PIGMENTS. CAN. 0834674, GRB. 107147, JAP. 0788652.
3,483,679.—FILTER APPARATUS. DEC. 16, 1969. BEL. 0708648, CAN. 0853503, FRA. 1552363, ITL. 0837050.

3,697,263.—METHOD OF CLEANING RESIDUAL LIQUID DEVELOPER FROM ELECTROPHOTOGRAPHIC PLATES. OCT. 10, 1972. ARG. 0181940, AUS. 0455091, BEL. 0758060, CAN. 0906334, EGR. 0087483, FRA. 7041623, GRB. 1328406, ITL. 0916264, JAP. 0749381, MEX. 0116862, SPN. 0385000, STZ. 0519186, SWD. 0365624, TIW. 0006850, USR. 0349206, VZL. 0032211.

3,924,568.—APPARATUS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES. DEC. 9, 1975. BEL. 0809747, FRA. 7401161, GRB. 1434673, ITL. 1003370.

3,937,570.—CLOUD SUPPRESSION IN AN ELECTROSTATIC COPYING APPARATUS. FEB. 10, 1976. CAN. 0974751, GRB. 1396922.

Class 5A 6

2,899,331.—PROCESS OF DEVELOPING ELECTROSTATIC IMAGE WITH CHARCOAL. AUG. 11, 1959.

Class 5B

3,103,445.—METHOD OF DEVELOPING AN ELECTROSTATIC LATENT IMAGE ON A XEROGRAPHIC PLATE. SEPT. 10, 1963, GRB. CAN. 0705363, GRB. 0956358.

3,251,706.—XEROGRAPHIC DEVELOPMENT METHOD AND APPARATUS. MAY 17, 1966. CAN. 0629542, FRA. 1120534, GER. 1020234, GRB. 0774433.

3,357,402.—ROTARY BRUSH DEVELOPMENT. DEC. 12, 1967. ARG. 0167329, ATR. 0279354, AUS. 0416581, BEL. 0708497, BRA. 0088306, CAN. 0859029, FRA. 1548189, GER. 1597901, GRB. 1200068, HUN. 0156541, ITL. 0819626, JAP. 0608703, MEX. 0106260, PLD. 0071357, SPN. 0348633, SWD. 0328190, VZL. 0023686.

3,542,466.—DEVELOPMENT APPARATUS. NOV. 24, 1970. AUS. 0428620, BEL. 0725611, CAN. 0884213, FRA. 1598505, GRB. 1203167, ITL. 0870661, JAP. 0641479, SPN. 0361653, SWD. 0343694.

3,558,339.—METHOD OF AND APPARATUS FOR STIPPLING. JAN. 26, 1971. CAN. 0871649, GRB. 1266969.

3,574,301.—DEVELOPING APPARATUS. APR. 13, 1971. AUS. 0449350, BEL. 0748073, CAN. 0873249, FRA. 7011549 GRB. 1303493, ITL. 0899146, JAP. 0715126, STZ. 0518579, SWD. 0356379, USR. 0331581.

3,592,167.—APPARATUS FOR LOADING TONER ON A DEVELOPING BRUSH. JULY 13, 1971.

3,613,638.—MATERIALS FOR FIBROUS DEVELOPMENT. OCT. 19, 1971. CAN. 0910736.

3,632,370.—MULTIPLE BRUSH DEVELOPMENT. JAN. 4, 1972.

3,636,924.—FUR BRUSH DEVELOPING APPARATUS. JAN. 25, 1972. CAN. 0912811, GRB. 1340060, JAP. 0751882.

3,638,613.—TONER DEVELOPER SYSTEM. FEB. 1, 1972. AUS. 0445403, BEL. 0747124, CAN. 0889762, EGR. 0081783, FRA. 7007651, GRB. 1294603, ITL. 0898243, SPN. 0377302, STZ. 0520960, SWD. 0354363, TIW. 0006827.

3,687,106.—DONOR APPARATUS AND METHOD. AUG. 29, 1972. ARG. 0185079, BEL. 0753207, CAN. 0911706, FRA. 7027124, GRB. 1314862, ITL. 0900444, JAP. 0733285, MEX. 0117318, PNM. 0002237, VZL. 0027517.

3,692,402.—MATERIALS FOR FIBROUS DEVELOPMENT AND CLEANING MEMBER. SEPT. 19, 1972.

3,847,306.—DEVELOPING APPARATUS. NOV. 12, 1974. CAN. 0966998, GRB. 1353651.

Class 5C

3,648,657.—ELECTROSTATIC IMAGE DEVELOPMENT APPARATUS. MAR. 14, 1972.

3,805,739.—CONTROLLING MULTIPLE VOLTAGE LEVELS FOR ELECTROSTATIC PRINTING. APR. 23, 1974. CAN. 0972552, GRB. 1382710.

3,854,449.—DEVELOPMENT APPARATUS. DEC. 17, 1974. ARG. 0195893, BEL. 0797447, CAN. 0982886, FRA. 7243003, GRB. 1435761, ITL. 0987768, MEX. 0130638, SAF. 0733407, SPN. 0414805, STZ. 0551030, SWD. 7307101, VZL. 0032067.

3,967,892.—A DEVELOPMENT SYSTEM. JULY 6, 1976.

3,981,272.—MAG BRUSH HOUSING WITH DETACHABLE SUMP SECTION. BEL. 0835755. SEPT. 21, 1976.

3,998,537.—SPLIT DEVELOPER HOUSING WITH INTERLOCKED FLOW GATE & CATCH. DEC. 21, 1976. BEL. 0835370.

4,027,621.—DEVELOPING SYSTEM FOR ELECTROSTATIC REPRODUCTION MACHINES. JUNE 7, 1977.

Class 5C 1

2,975,758.—APPARATUS FOR DEVELOPING ELECTROSTATIC IMAGES. MAR. 21, 1961. CAN. 0622422, GER. 1186746. GRB. 0944654, JAP. 0319308.

3,015,305.—DEVELOPMENT OF ELECTROSTATIC IMAGES. JAN. 2, 1962.

3,113,042.—XEROGRAPHIC APPARATUS WITH MAGNETIC CONVEYOR. DEC. 3, 1963. CAN. 0738917, GRB. 0987985.

3,176,652.—XEROGRAPHIC DEVELOPING APPARATUS. APR. 6, 1965. CAN. 0737851, GRB. 1018787, JAP. 0627140.

3,570,453.—DEVELOPMENT APPARATUS. MAR. 16, 1971. ARG. 0181813, AUS. 0429322, BEL. 0737102, CAN. 0885918, CZC. 0161861, EGR. 0081317, FRA. 6927184, GRB. 1256282, ITL. 0869726, JAP. 0716364, SPN. 0370289, STZ. 0496263, SWD. 0353165, TIW. 0005357, USR. 0380031.

3,572,288.—DEVELOPMENT APPARATUS. MAR. 23, 1971. CAN. 0885917.

3,572,289.—MAGNETIC BRUSH DEVELOPMENT APPARATUS. MAR. 3, 1971.

3,575,139.—ELECTROSTATIC MAGNETIC DEVELOPER UNIT GATING APPARATUS. APR. 20, 1971. CAN. 0930538.

3,583,364.—DEVELOPMENT APPARATUS. JUNE 8, 1971. BEL. 0738574, CAN. 0883725, FRA. 6930427, GRB. 1273187, ITL. 0871550, JAP. 0674394.

3,608,522.—XEROGRAPHIC DEVELOPMENT CONTROL APPARATUS. SEPT. 28, 1971. CAN. 0911704.

3,640,248.—ELECTROSTATIC MAGNETIC DEVELOPING APPARATUS—MULTIPLE MAGNETIC BRUSH UNIT. FEB. 8, 1972. ARG. 0184080, ATR. 0312419, AUS. 0437486, BEL. 0751486, BRA. 0088030, CAN. 0929337, CHL. 0026193, EGR. 0084331, FRA. 7020260, GRB. 1251477, ITL. 0893838, MEX. 0117951, NOR. 0133049, PNM. 0002537, SAF. 0703774, SPN. 0380378, STZ. 0509614, SWD. 0359664, TIW. 0007168, USR. 0419061, VZL. 0025834.

3,641,980.—DEVELOPMENT APPARATUS. FEB. 15, 1972. ARG. 0185081, AUS. 0445430, BEL. 0757698, CAN. 0913354, EGR. 0085713, FRA. 7038237, GRB. 1273456, ITL. 0909031, JAP. 0720627, MEX. 0118187, SPN. 0384576, STZ. 0516183, SWD. 0362510, TIW. 0006205.

3,665,891.—MAGNETIC BRUSH DEVELOPMENT APPARATUS. MAY 30, 1972. CAN. 0914904, GRB. 1347138, JAP. 783770.

3,683,406.—MAGNETIC INCREMENTAL CASCADE DEVELOPMENT SYSTEM. AUG. 8, 1972. CAN. 0945200, GRB. 1335995, JAP. 0752521.

3,690,912.—METHOD FOR MAGNETIC DEVELOPMENT OF LATENT ELECTROSTATIC IMAGE. SEPT. 12, 1972.

3,697,050.—CROSS MIXING BAFFLE. OCT. 10, 1972. CAN. 0951110.

3,709,713.—METHOD FOR MAGNETIC DEVELOPMENT. JAN. 9, 1973.

3,724,422.—MAGNETIC BRUSH DEVELOPING APPARATUS. APR. 3, 1973. ARG. 0190744, AUS. 0457858, BEL. 0776598, CAN. 0951111, EGR. 0097962, FRA. 7145341, GRB. 1373010, ITL. 0943877, MEX. 0124647, SPN. 0397854, SWD. 0365880, USR. 0459904.

3,788,275.—MAGNETIC SHIELDING APPARATUS. JAN. 29, 1974. BEL. 0801242, CAN. 0973703, GRB. 1438332, ITL. 0990692.

3,828,728.—XEROGRAPHIC DEVELOPMENT SYSTEM. AUG. 13, 1974. BEL. 0791193, CAN. 0980635, FRA. 7240058, GRB. 1413337, ITL. 0970350, SWD. 7214311.

3,866,564.—MAGNETIC BRUSH DEVELOPING APPARATUS FOR COPIERS. FEB. 18, 1975.

3,872,830.—MAGNETIC BRUSH DEVELOPING APPARATUS. MAR. 25, 1975.

3,880,517.—REPRODUCTION MACHINE DEVELOPER APPARATUS. APR. 29, 1975.

3,880,518.—FLOATING DEVELOPER PLATEN FOR REPRODUCTION APPARATUS. APR. 29, 1975.

3,887,367.—METHOD FOR TEMPERATURE STABLIZING PHOTORECEPTORS. JUNE 3, 1975.

3,893,815.—MAGNETIC BRUSH SUPPORT MEMBER. JULY 8, 1975.

3,906,121.—ELECTROSTATIC DEVELOPMENT METHOD USING MAGNETIC BUSH CONFIGURATION TRANSPORT. SEPT. 16, 1975. CAN. 0970631, GRB. 1381049.

3,906,898.—MAGNETIC BRUSH DEVELOPING APPARATUS. SEPT. 23, 1975.

3,911,864.—TONER PRELOADED MAGNETIC BRUSH DEVELOPMENT SYSTEM. OCT. 14, 1975. BEL. 0809859, STZ. 0568594.

3,915,121.—DEVELOPMENT APPARATUS. OCT. 28, 1975.

3,920,329.—BACKGROUND REMOVAL APPARATUS. NOV. 18, 1975.

3,921,577.—MAGNETIC DEVELOPMENT UNIT. NOV. 25, 1975.
3,926,516.—DEVELOPMENT APPARATUS FOR AN ELECTROSTATOGRAPHIC PRINTING MACHINE. DEC. 16, 1975.
3,927,640.—DEVELOPER SHUT-OFF APPARATUS. DEC. 23, 1975.
3,934,549.—TRANSFER APPARATUS. JAN. 27, 1976.
3,945,342.—MAGNETIC BRUSH SUPPORT MEMBER. MAR. 23, 1976.
3,948,217.—MAGNETIC BRUSH DEVELOPMENT SYSTEM WITH FLOATING DEVELOPMENT ROLLS. APR. 6, 1976. BEL. 0835370.
3,949,704.—MAGNETIC BRUSH DEVELOPING APPARATUS. APR. 13, 1976.
3,950,089.—COATED ROLL FOR MAGNETIC BRUSH DEVELOPMENT & CLEANING SYSTEMS. APR. 13, 1976.
3,953,121.—ARTICULATED DEVELOPMENT APPARATUS. APR. 27, 1976. IRN. 0013434.
3,962,003.—METHOD OF FORMING MAGNETIC BRUSH SUPPORT MEMBER. JUNE 8, 1976.
3,968,773. JULY 13, 1976.
3,982,498.—DEVELOPMENT APPARATUS. SEPT. 28, 1976. FRA. 7436713.
3,991,713.—DEVELOPMENT APPARATUS FOR AN ELECTROSTATOGRAPHIC PRINTING MACHINE. NOV. 16, 1976.
3,996,892.—SPATIALLY PROGRAMMABLE ELECTRODE TYPE ROLL FOR ELECTROSTATOGRAPHIC PROCESSORS AND THE LIKE. DEC. 14, 1976.
4,033,293.—A DEVELOPING DEVICE OF AN ELECTROPHOTOGRAPHIC COPYING MACHINE. JULY 5, 1977.
4,033,294.—DEVELOPER MIXING AND TRANSPORTING AUGER FOR MAGNETIC BRUSH DEVELOPING APPARATUS. JULY 5, 1977.
4,034,709.—AN IMPROVED DEVELOPER ROLL. JULY 12, 1977.

Class 5C 1A

2,832,311.—APPARATUS FOR DEVELOPMENT OF ELECTROSTATIC IMAGES. APR. 29, 1958. CAN. 0605908, GRB. 0889202.
3,584,601.—MAGNETIC BRUSH BELT DEVELOPMENT. JUNE 15, 1971. CAN. 0884799, GRB. 1238277.
3,592,166.—APPARATUS FOR DEVELOPING ELECTROSTATIC IMAGES. JULY 13, 1971. CAN. 0887598, GRB. 1275822, JAP. 1162298.
3,638,614.—ELECTROSTATIC LATENT IMAGE DEVELOPMENT APPARATUS. FEB. 1, 1972. CAN. 0929338, GRB. 1304236, JAP. 0808219.
3,741,790.—METHOD FOR MAGNETICALLY DEVELOPING ELECTROSTATIC IMAGES. JUNE 26, 1973.
3,823,688.—MAGNETIC BRUSH ASSEMBLY. JULY 16, 1974. BEL. 0794507, CAN. 0989607, FRA. 7302247, GRB. 1394502, SWD. 7301014.
3,965,862.—XEROGRAPHIC DEVELOPMENT SYSTEM. JUNE 29, 1976.

Class 5C 1B

3,532,071.—DEVELOPMENT APPARATUS. OCT. 6, 1970. CAN. 0883763, GRB. 1227549, JAP. 0650630.
3,552,355.—DEVELOPMENT APPARATUS. JAN. 5, 1971. ARG. 0175330, ATR. 0300575, AUS. 0441519, BEL. 0730371, CAN. 0914005, CZC. 0161850, DNK. 0129880, EGR. 0077412, EIR. 0032786, FRA. 6909741, GRB. 1263566, GRK. 0039919, IND. 0120212, ISR. 0031757, ITL. 0860255, LXB. 0058295, MEX. 0111374, NOR. 0128037, NZL. 0155695, PAK. 0120989, PLD. 0017651, PLP. 0006606, PNM. 0001723, PTG. 0051392, RHD. 1156947, SAF. 0691728, SPN. 0365439, STZ. 0499140, SWD. 0341530, TIW. 0006602, UAR. 0009242, USR. 0383338, VTM. 0001829, VZL. 0023745.
3,645,770.—METHOD FOR DEVELOPING XEROGRAPHIC IMAGES. FEB. 29, 1972.
3,893,414.—METHOD AND APP FOR VARYING DEVELOPER BANDWIDTH. JULY 8, 1975.
3,908,596.—SEGMENTED GATE DEVELOPER FLOW CONTROLLER. SEPT. 30, 1975.
3,930,466.—SEGMENTED GATE DEVELOPER FLOW CONTROLLER. JAN. 6, 1976.
3,990,393.—APPARATUS FOR DEPOSITING MAGNETIC MATERIAL ON AN IMAGE BEARING MEMBER. NOV. 9, 1976.
3,998,184.—A DEVELOPMENT APPARATUS. DEC. 21, 1976.
4,025,179.—PASSIVE CROSS MIXING SYSTEM. MAY 24, 1977.

Class 5C 2

3,508,823.—DUPLICATING APPARATUS. APR. 28, 1970.
3,836,244.—COLOR XEROGRAPHY. SEPT. 17, 1974.
3,941,280.—APPARATUS FOR CONTROLLING DEVELOPER EFFICIENCY. MAR. 2, 1976.
3,965,862.—XEROGRAPHIC DEVELOPMENT SYSTEM. JUNE 29, 1976.

Class 5C 3

2,846,333.—METHOD OF DEVELOPING ELECTROSTATIC IMAGES. AUG. 5, 1958. CAN. 0609146.
3,906,897.—DEVELOPMENT APPARATUS. SEPT. 23, 1975. ARG. 0195893, BEL. 0797447, CAN. 0982886, FRA. 7243003, GRB. 1435761, ITL. 0987768, MEX. 0130638, SAF. 0733407, SPN. 0414905, STZ. 0551030, SWD. 7307101, VZL. 0032067.
3,940,272.—METHOD OF DEVELOPING AN ELECTROSTATIC LATENT IMAGE. FEB. 24, 1976. ARG. 0195893, BEL. 0797447, CAN. 0982886, FRA. 7243003, GRB. 1435761, ITL. 0987768, MEX. 0130638, SAF. 0733407, SPN. 0414905, STZ. 0551030, SWD. 7307101, VZL. 0032067.

Class 5D

2,618,551.—DEVELOPER FOR ELECTROSTATIC IMAGES. NOV. 18, 1952. AUS. 0148642, CAN. 0495360, GER. 0926587, GRB. 0686466, STZ. 0292431, SWD. 0161100.
3,768,904.—PRINTING APPARATUS INCLUDING REGISTRATION CONTROL. OCT. 30, 1973.
3,793,985.—IMAGING SYSTEM. FEB. 26, 1974.
3,924,944.—SPLIT DEVELOPER HOUSING. DEC. 9, 1975.
4,015,561.—ANTI-GRAVITATIONAL CASCADE DEVELOPMENT FOR ELECTROSTATIC PROCESSOR. APR. 5, 1977.

Class 5D 1

3,219,014.—MECHANICAL SHIELD TO PROTECT MAGNETIC CORE IN XEROGRAPHIC DEVELOPING APPARATUS. NOV. 23, 1965. CAN. 0757573, FRA. 1393298, GER. 1497076, GRB. 1034099, ITL. 0710188, JAP. 0477812.
3,685,488.—XEROGRAPHIC DEVELOPMENT. AUG. 22, 1972.
3,884,571.—LEAKAGE DEVELOPER RECIRCULATION. MAY 20, 1975. HOL. 3884571.
3,999,512.—ELECTROSTATIC DEVELOPMENT SYSTEM WITH PASSIVE STORAGE CAPACITY. DEC. 28, 1976. BEL. 0823656.
4,033,293.—A DEVELOPING DEVICE OF AN ELECTROPHOTOGRAPHIC COPYING MACHINE. JULY 5, 1977.

Class 5D 1A

2,705,199.—METHOD OF DEVELOPING AN ELECTROSTATIC LATENT IMAGE. MAR. 29, 1955. CAN. 0525077.
3,067,720.—XEROGRAPHIC DEVELOPING APPARATUS. DEC. 11, 1962. ARG. 0175377, BEL. 0750689, PNM. 0002011, VZL. 0025828.
3,095,325.—TONER DISPENSER DRIVE MECHANISMS. JUNE 25, 1963.
3,190,264.—XEROGRAPHIC DEVELOPING APPARATUS. JUNE 22, 1965. CAN. 0733036.
3,303,817.—XEROGRAPHIC DEVELOPING APPARATUS. FEB. 14, 1967.
3,472,657.—XEROGRAPHIC DEVELOPMENT METHOD AND APPARATUS. OCT. 14, 1969. AUS. 0418178, BEL. 0680374, CAN. 0813843, FRA. 1477370, GRB. 1141167, ITL. 0766858, JAP. 0537665, MEX. 0091119, SWD. 0330833.
3,593,838.—CONVEYOR BELT. JULY 20, 1971. CAN. 0883720.
3,635,553.—CASCADE DEVELOPING APPARATUS UTILIZING A ROTARY WHEEL WITH SCOOPS. JAN. 18, 1972.
3,649,262.—SIMULTANEOUS DEVELOPMENT-CLEANING OF SAME AREA OF AN ELECTROSTATOGRAPHIC IMAGE SUPPORT SURFACE. MAR. 14, 1972. AUS. 0445365, BEL. 0743661, CAN. 0916232, FRA. 6944511, GRB. 1296997, ITL. 0882670, USR. 0358873.
3,662,711.—DEVELOPMENT APPARATUS. MAY 16, 1972. CAN. 0945757, GRB. 1345253.
3,663,291.—CASCADE DEVELOPMENT. MAY 16, 1972.
3,678,896.—CONVEYOR SYSTEM. JULY 25, 1972. CAN. 0952465, GRB. 1325831.

Class 5D 1B

3,122,454.—XEROGRAPHIC DEVELOPING APPARATUS. FEB. 25, 1964.
3,435,803.—LIFTING APPARATUS. APR. 1, 1969. CAN. 0937394, FRA. 1511169, GER. 1456806, GRB. 1165378, ITL. 0788954, JAP. 0542586, MEX. 0095039.
3,448,724.—DEVELOPING APPARATUS. JUNE 10, 1969. ARG. 0174576, AUS. 0430081, BEL. 0726573, CAN. 0884214, CZC. 0157054, EGR. 0077413, FRA. 1598024, GRB. 1258781, ITL. 0854008, JAP. 0665972, MEX. 0107603, PNM. 0001429, RMN. 0054735, SAF. 0069179, SPN. 0362358, STZ. 0486057, SWD. 0338507, USR. 0410595, VZL. 0023716.
3,472,657.—XEROGRAPHIC DEVELOPMENT METHOD AND APPARATUS. OCT. 14, 1969. AUS. 0418178, BEL. 0680374, CAN. 0813843, FRA. 1477370, GRB. 1141167, ITL. 0766858, JAP. 0537665, MEX. 0091119, SWD. 0330833.
3,606,533.—XEROGRAPHIC DEVELOPMENT. SEPT. 20, 1971.
3,661,118.—ELECTROSTATIC DEVELOPMENT. MAY 9, 1972. CAN. 0951107, GRB. 1359234.
3,695,224.—CASCADE DEVELOPMENT. OCT. 3, 1972.
3,835,811.—DEVELOPMENT APPARATUS FOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. SEPT. 17, 1974.
3,888,578.—DEVELOPMENT APPARATUS FOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 10, 1975.
3,900,255.—PADDLE-WHEEL DEVELOPMENT SYSTEM. AUG. 19, 1975.

Class 5D 1C

2,880,696.—APPARATUS FOR DEVELOPING AN ELECTROSTATIC LATENT IMAGE. APR. 7, 1959. CAN. 0698394.
3,117,891.—XEROGRAPHIC APPARATUS. JAN. 14, 1964. CAN. 0740394, GRB. 1006078.
3,287,150.—CASCADE DEVELOPMENT PROCESS W/TWO-COMPONENT DEVELOPER. NOV. 22, 1966.
3,415,224.—MAGNETIC CASCADE DEV APPARATUS. DEC. 10, 1968. AUS. 0423497, BEL. 0725943, CAN. 0852660, COR. 000948A, EGR. 0074432, FRA. 1603904, GRB. 1217281, ITL. 0849521, LXB. 0057873, MRC. 0014726, PTG. 0051108, SAF. 0688440, SPN. 0361840, STZ. 0493872, SWD. 0345753, SYA. 0002440, ZMB. 0166972.
3,667,427.—CASCADE APPARATUS. JUNE 6, 1972. CAN. 0951112, GRB. 1377152.
3,678,897.—DEVELOPER MIXING APPARATUS. JULY 25, 1972. BEL. 0778426, CAN. 0951113, FRA. 7203212, GRB. 1377151, ITL. 0946909.
3,741,372.—CONVEYOR FOR DEVELOPER APPARATUS. JUNE 26, 1973.

Class 5D 1D

2,889,234.—XEROGRAPHIC DEVELOPMENT PROCESS. JUNE 2, 1959.
3,550,555.—XEROGRAPHIC DEVELOPER SEPARATION. DEC. 29, 1970. CAN. 0855652, GRB. 1238032.

Class 5D 2

3,105,770.—CASCADE DEVELOPMENT IMPROVEMENT. OCT. 1, 1963. AUS. 0252867, BEL. 0749545, CAN. 0746453, FRA. 1286397, GER. 1278244, GRB. 0986844, ITL. 0648862, JAP. 0517396.
3,375,807.—XEROGRAPHIC DEVELOPER. APR. 2, 1968. CAN. 0819049, MEX. 0092092, VZL. 0024448.
3,542,579.—ELECTROSTATIC IMAGE DEVELOPMENT. NOV. 24, 1970.
3,973,517.—DEVELOPMENT DEVICE AND METHOD. AUG. 10, 1976.

Class 5D 3

3,057,324.—XEROGRAPHIC DEVELOPING APPARATUS. OCT. 9, 1962.
3,336,905.—XEROGRAPHIC DEVELOPER APPARATUS. AUG. 22, 1967. CAN. 0793223, GRB. 1123059, JAP. 0508405.
3,428,025.—XEROGRAPHIC DEVELOPMENT APPARATUS-POWDER CLOUD BY CHARGE BREAKDOWN. DEC. 18, 1969.
3,638,610.—DEVELOPMENT APPARATUS. FEB. 1, 1972. CAN. 0916432, FRA. 7041622.
3,638,611.—ELECTRODED DEVELOPMENT DEVICE. FEB. 1, 1972. ARG. 0184658, ATR. 0308537, AUS. 0446323, BEL. 0752936, CAN. 0913893, CHL. 0025914, DNK. 0129305, EGR. 0084129, FRA. 7024067, GRB. 1258738, GUA. 0002615, IND. 0127311, ITL. 0900196, JAP. 0719143, MEX. 0115403, NOR. 0130134, NZL. 0160644, PLD. 0081287, PLP. 0006288, PNM. 0002266, PTG. 0054072, SAF. 0704532, SPN. 0381383, STZ. 0520961, SWD. 0359386, TIW. 0005923, USR. 0414818.
3,682,132.—AUTOMATIC DEVELOPER CONTROLLER. AUG. 8, 1972.

Class 5D 4

3,347,691.—XEROGRAPHIC DEVELOPMENT. OCT. 17, 1967. ARG. 0168482, CAN. 0827608, FRA. 1497061, GRB. 1166464, ITL. 0788454, JAP. 0589492, MEX. 0093822, VZL. 0032595.
3,412,710.—CLEAN UP ELECTRODE. NOV. 26, 1968. BEL. 0704923, CAN. 0867283, FRA. 1540699, GRB. 1196637, ITL. 0814605, JAP. 0585018.
3,620,191.—BIASED INPUT CHUTE. NOV. 16, 1971. ARG. 0199542, ATR. 0324837, AUS. 0446250, BEL. 0752943, CAN. 0918411, CHL. 0025871, DNK. 0128800, EGR. 0083704, FRA. 7024665, GRB. 1310444, GUA. 0002727, IND. 0127313, ITL. 0900192, JAP. 0731612, MEX. 0114979, NOR. 0132115, NZL. 0160647, PLP. 0008638, PNM. 0002269, PTG. 0054075, SAF. 70/4534, SPN. 0381382, STZ. 0528761, SWD. 0359387, TIW. 0007164, USR. 0358874.
3,669,072.—DEVELOPER APPARATUS. JUNE 13, 1972. CAN. 0930539, GRB. 1343141.
3,682,538.—XEROGRAPHIC PICK-OFF PLATE. AUG. 8, 1972. ARG. 0186267, BEL. 0764562, CAN. 0935635, FRA. 7110750, GRB. 1349272, ITL. 0922348, MEX. 0119677, USR. 0426387.
3,682,677.—BACKGROUND REMOVAL. AUG. 8, 1972.
3,795,222.—DEVELOPMENT ELECTRODE SYSTEM. MAR. 5, 1974.
3,807,997.—PLURAL ELECTRODE DEVELOPMENT METHODS FOR LATENT ELECTROSTATIC IMAGES. APR. 30, 1974. CAN. 0979299, GRB. 1381910.
3,808,026.—LIQUID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGE. APR. 30, 1974.
3,834,930.—METHOD OF DEVELOPING ELECTROSTATOGRAPHIC IMAGE. SEPT. 10, 1974.
3,907,695.—LIQUID DEVELOPER. SEPT. 23, 1975.

Class 5D 5

2,550,724.—APPARATUS FOR APPLYING POWDER TO AN ELECTROPHOTOGRAPHIC PLATE. MAY 1, 1951.
2,550,738.—APPARATUS FOR APPLYING POWDER TO AN ELECTROPHOTOGRAPHIC PLATE - TRAY WITH GATES. MAY 2, 1951.
2,635,046.—DEVELOPING DEVICE FOR ELECTROSTATIC IMAGES. APR. 14, 1953.
2,827,013.—ELECTROPHOTOGRAPHIC DEVELOPING DEVICE. MAR. 18, 1958.
3,223,548.—XEROGRAPHIC DEVELOPING MACHINE AND METHOD. DEC. 14, 1965.
3,316,878.—CASCADE DEVELOPING APPARATUS. MAY 2, 1967.

Class 5E

3,357,399.—COMBINED FLUIDIZED BED AND INVERTED CASCADE DEVELOPMENT APPARATUS. DEC. 12, 1967. ARG. 0171121, CAN. 0821473, CHL. 0022944, MEX. 0096075, PRU. 0009332, URG. 0008548, VZL. 0021060.
3,677,633.—PORTABLE DOCUMENT ABSTRACTOR. JULY 18, 1972.
3,738,832.—COLOR ELECTROPHOTOGRAPHIC PROCESS EMPLOYING LIQUID DEVELOPER CONTAINING GELATINAIN. JUNE 12, 1973.
3,748,126.—MULTIPLE COPY SELECTIVE RE-WETTING PRINTING. JULY 24, 1973.
3,748,127.—TREATMENT OF REUSABLE PHOTOCONDUCTIVE SURFACES WITH LEWIS ACIDS OR BASES. JULY 24, 1973.
3,776,631.—LIQUID DEVELOPER CLEANING SYSTEM. DEC. 4, 1973.
3,865,611.—METHOD FOR ELECTROSTATIC IMAGE DEVELOPMENT EMPLOYING TONER AND CARRIER SUPPORTED BY CONDUCTIVE. FEB. 11, 1975.
3,893,854.—PHOTOGRAPHIC ARTICLES WITH GAPS FOR PROCESSING FLUIDS. JULY 8, 1975.
3,918,809.—APPARATUS FOR CLEANING A SURFACE SUPPORT. NOV. 11, 1975, GRB. 1438660.

3,927,934.—ELECTROSTATOGRAPHIC REPRODUCTION MACHINES. DEC. 23, 1975.
3,940,282.—BLADE CLEANING OF SURFACE WITH REVERSE MOVEMENT. FEB. 24, 1976.
3,951,653.—METHOD OF PREVENTING TONER BUILD-UP ON ELECTRODES DURING LIQUID DEVELOPMENT. APR. 20, 1976.
3,973,699.—LIQUID DISPENSING APPARATUS UTILIZING DOUBLE ACTING PISTON. AUG. 10, 1976, GRB. 1455885.
3,974,554.—QUANDRANGULAR TRIHETICORD GRAVURE ROLL. AUG. 17, 1976, BEL. 0841855.
3,978,817.—PATTERNED GRAVURE & DOCTORING MEANS THEREFOR. SEPT. 7, 1976. BEL. 0841855.
3,980,404.—XEROGRAPHIC APPARATUS HAVING IMPROVED FLUID DISPENSING MEMBER. SEPT. 14, 1976.
4,017,174.—DEVELOPER ASSEMBLY SUPPORT. APR. 12, 1977.
4,020,788.—DOCTORING MEANS. MAY 3, 1977.
4,023,900.—VARIABLE SPEED LIQUID DEVELOPMENT ELECTROSTATOGRAPHIC APPARATUS. MAY 17, 1977.
4,024,834.—TEMPERATURE COMPENSATED DOCTOR BLADE. MAY 24, 1977. GRB. 1430518.
4,037,952.—METHOD OF PREVENTING TONER BUILD-UP ON ELECTRODES DURING LIQUID DEVELOPMENT. JULY 26, 1977.

Class 5E 1

2,551,582.—METHOD OF PRINTING AND DEVELOPING SOLVENT IMAGES - ELECTROPHOTOGRAPHY. MAY 8, 1951.
2,965,482.—METHOD FOR FIXING XEROGRAPHIC IMAGES. DEC. 20, 1960.
3,005,726.—PROCESS OF DEVELOPING ELECTROSTATIC IMAGES. OCT. 24, 1961.

Class 5E 2

3,068,115.—ELECTROSTATIC EMULSION DEVELOPMENT. DEC. 11, 1962. GER. 1302344, GRB. 1006230, JAP. 0466442.
3,730,708.—ELECTROPHOTOGRAPHIC MULTI-COLOR PROCESS EMPLOYING LIQUID DEVELOPER. MAY 1, 1973.
3,776,723.—LIQUID TRANSFER ELECTROPHOTOGRAPHIC DEVELOPMENT PROCESS. DEC. 4, 1973.
3,862,618.—LIQUID DEVELOPING APPARATUS DEVELOPING AN ELECTROSTATIC IMAGE. JAN. 28, 1975.
3,960,444.—ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 1, 1976.
4,007,401.—ELECTROPHOTOGRAPHIC PRINTING METHOD. FEB. 8, 1977.

Class 5E 3

3,080,251.—METHOD OF XEROGRAPHIC DEVELOPMENT. MAR. 5, 1963.

Class 5E 4

3,010,842.—DEVELOPMENT OF ELECTROSTATIC IMAGES. NOV. 28, 1961. CAN. 0704604.
3,064,622.—IMMERSION DEVELOPMENT. NOV. 20, 1962. CAN. 0729544, FRA. 1296944, GER. 1190787, GRB. 0990968, JAP. 0451638.
3,129,115.—XEROGRAPHIC DEVELOPING APPARATUS. APR. 14, 1964. GRB. 1008004.
3,251,688.—LIQUID TRANSFER DEVELOPMENT. MAY 17, 1966. CAN. 0765523, FRA. 1362253, GRB. 1032013.
3,270,637.—ELECTROVISCOUS RECORDING. SEPT. 6, 1966. AUS. 0403009, CAN. 0740112, FRA. 1414126, GER. 1497109, GRB. 1086197, HOL. 0141644, ITL. 0738077, JAP. 0508403, NOR. 0127882, STZ. 0472710, SWD. 0331032.
3,281,241.—METHOD OF FORMING A VISUAL RECORD OF A LATENT IMAGE RECEIVING WEB. OCT. 25, 1966. AUS. 0275028, CAN. 0766420, FRA. 1362254, GER. 1303008, GRB. 1035236, ITL. 0699412, JAP. 0470426.
3,284,224.—CONTROLLED XEROGRAPHIC DEVELOPMENT. NOV. 8, 1966. CAN. 0751349, GRB. 1038801, JAP. 0640353.
3,334,613.—XEROGRAPHIC DEVELOPMENT APPARATUS. AUG. 8, 1967. CAN. 0787870, GRB. 1125628, JAP. 0546654.
3,369,918.—DEV OF LATENT ELECTROSTATIC IMGS W/ CREATED WAVES OF LIQUID DEVELOPER. FEB. 20, 1968.
3,576,623.—DEVELOPMENT SYSTEM EMPLOYING A CORONODE IMMERSED IN A LIQUID DEVELOPER. APR. 27, 1971. AUS. 0434437, CAN. 0872191, GER. 1908292, GRB. 1259880, JAP. 0675662.
3,577,259.—LIQUID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGES UTILIZING A TONER-FREE ZONE. MAY 4, 1971.
3,592,678.—LIQUID DONOR DEVELOPMENT WITH ELECTROPHORETIC CLEANING. JULY 13, 1971.
3,620,800.—CLEANING LIQUID DEVELOPED ELECTROSTATIC IMAGES BY CONTACT WITH VAPORIZED CLEANING FLUID. NOV. 16, 1971. CAN. 0933997.
3,627,410.—REPRODUCTION APPARATUS WITH LIQUID. DEC. 14, 1971. CAN. 0886508.
3,627,557.—LIQUID DVLPMNT BY REDUCING VISCOSITY OF DVLPR ON ROLLER APPLICATION PRIOR TO DEVELOPMENT. DEC. 14, 1971.
3,628,981.—LIQUID TONER DEVELOPMENT. DEC. 21, 1971. ARG. 0181932, MEX. 0116451.
3,642,471.—LIQUID DEVELOPING PROCESS IN AN ELECTROSTATOGRAPHIC IMAGING SYSTEM. FEB. 15, 1972.
3,642,515.—LIQUID DEVELOPMENT UTILIZING A CURVILINEAR DEVELOPMENT ELECTRODE. FEB. 15, 1972.
3,652,319.—CYCLIC IMAGING SYSTEM. MAR. 28, 1972. AUS. 0441527, BEL. 0761029, CAN. 0944010, FRA. 7047634, GRB. 1336739, ITL. 0913957, JAP. 0771819, SWD. 0363175.
3,656,948.—SELECTED REMOVAL OF LIQUID DVLPR IN CYCLICAL ELECTROPHOTOGRAPHIC PROCESS. APR. 18, 1972. CAN. 0906335, GRB. 1335054, JAP. 0760503.
3,671,290.—IMAGING SYSTEM. JUNE 20, 1972.
3,672,884.—ELECTROSTATIC PRINTING. JUNE 27, 1972.
3,692,520.—DVLPNG ELCTRSTIC IMGS EMPLYNG FATTY ACD ESTRS INHBT DVLPR BUILD-UP. SEPT. 19, 1972. CAN. 0940361, GRB. 1332674.
3,784,397.—IMAGING SYSTEM. JAN. 8, 1974.
3,800,744.—ELECTROSTATIC LATENT IMAGE DEVELOPING APPARATUS. APR. 2, 1974.
3,804,510.—IMAGING DEVELOPING SYSTEM. APR. 16, 1974.
3,808,025.—LIQUID DEVELOPING METHOD FOR ELECTROPHOTOGRAPHY. APR. 30, 1974.
3,816,114.—ELECTRO-PHOTOGRAPHIC METHOD. JUNE 11, 1974.
3,817,212.—ELECTROSTATOGRAPHIC LIQUID DEVELOPMENT APPARATUS. JUNE 18, 1974.
3,832,975.—ELECTROPHOTOGRAPHIC APPARATUS. SEPT. 3, 1974.
3,836,384.—IMAGING SYSTEMS. SEPT. 17, 1974.
3,841,893.—CHARGE CONTROL AGENTS FOR LIQUID DEVELOPERS. OCT. 15, 1974.
3,849,171.—METHOD FOR CLEANING BACKGROUND AREAS FROM DEVELOPED RECORDING SURFACES. NOV. 19, 1974. CAN. 0941882.
3,862,619.—ELECTRO-PHOTOGRAPHIC APPARATUS. JAN. 28, 1975.
3,864,125.—ELECTROPHOTOGRAPHIC METHOD OF MAKING AN IMAGING MASTER. FEB. 4, 1975.
3,870,514.—LIQUID DEVELOPMENT FOR THE ELECTRONIC PHOTOGRAPHY. MAR. 11, 1975.
3,877,934.—INDUCTION IMAGING WITH IN-PLACE DEVELOPMENT. APR. 15, 1975.
3,890,040.—INDUCTION IMAGING APPARATUS. JUNE 17, 1975.
3,913,524.—LIQUID DEVELOPING APPARATUS FOR ELECTROPHOTOGRAPHY. OCT. 21, 1975.
3,926,825.—LIQUID DEVELOPER COMPOSITION AND PROCESS FOR PREPARING SAME. DEC. 16, 1975.
3,931,792.—ABRASIVE LIQUID DEVELOPING APPARATUS. JAN. 13, 1976.
3,942,474.—DEVELOPING SYSTEMS. MAR. 9, 1976. ARG. 0181931, ATR. 0311971, AUS. 0457519, BEL. 0752802, CAN. 0904108, CHL. 0026275, EGR. 0084325, FRA. 7024068, GRB. 1320509, ITL. 0894828, JAP. 0815361, MEX. 0116454, SAF. 0704474, SPN. 0381297, STZ. 0513437, SWD. 0357269, TIW. 0006614, 0033335.
3,943,268.—LIQUID DEVELOPER PROCESS AND APP FOR ELECTROSTATOGRAPHY. MAR. 9, 1976. CAN. 0904683.
3,965,861.—SEPARATED ROLLER LIQUID DEVELOPMENT. JUNE 29, 1976.
3,968,044.—MILLED LIQUID DEVELOPER. JULY 6, 1976.
3,970,043.—ELECTROPHOTOGRAPHIC DEVICE FOR LIQUID DEVELOPMENT. AUG. 20, 1976.

3,971,659.—COLOR ELECTROPHOTOGRAPHIC PROCESS USING PHOTO CONDUCTIVE PARTICLES IN LIQUID DEVELOPER. JULY 27, 1976.
3,972,305.—IMAGING SYSTEM. AUG. 3, 1976. CAN. 0904683.
3,976,808.—IMAGING SYSTEMS. AUG. 24, 1976.
3,986,968.—MILLED AND POLAR SOLVENT EXTRACTED LIQUID DEVELOPER. OCT. 19, 1976.

Class 5E 5

3,084,043.—LIQUID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGES. APR. 2, 1963. CAN. 0678365, GRB. 0880597.
3,372,027.—XEROGRAPHIC LIQUID DEVELOPMENT. MAR. 5, 1968. CAN. 0800963, GRB. 1091169, ITL. 0760712, JAP. 0571175.
3,652,319.—CYCLIC IMAGING SYSTEM. MAR. 28, 1972. AUS. 0441527, BEL. 0761029, CAN. 0944010, FRA. 7047634, GRB. 1336739, ITL. 0913957, JAP. 0771819, SWD. 0363175.
3,667,428.—DEVELOPING SYSTEMS. JUNE 6, 1972. ARG. 0195534, ATR. 0312420, AUS. 0456202, BEL. 0752805, CAN. 0904107, CHL. 0026274, CZC. 0164275, DNK. 0126528, EGR. 0083514, FRA. 7024066, GRB. 1320232, ITL. 0894827, JAP. 0745765, MEX. 0114978, PNM. 0002541, SAF. 0704475, SPN. 0194607, STZ. 0543753, SWD. 0366126, TIW. 0006616, USR. 0420196.
3,676,215.—IMAGING SYSTEM. JULY 11, 1972. ARG. 0182525, AUS. 0430692, BEL. 0732139, CAN. 0900770, FRA. 6913232, GRB. 1272306, ITL. 0857440, JAP. 0698292, MEX. 0109289, PNM. 0001433, SPN. 0386902, SWD. 0352117, USR. 0309549.
3,692,520.—DVLPNG ELCTRSTIC IMGS EMPLYNG FATTY ACD ESTRS INHBT DVLPR BUILD-UP. SEPT. 19, 1972. CAN. 0940361, GRB. 1332674.
3,712,728.—REVERSAL DEVELOPMENT. JAN. 23, 1973. BEL. 0777718, CAN. 0949826, FRA. 7201004, GRB. 1374831, ITL. 0946351.
3,729,419.—LIQUID DEVELOPER. APR. 24, 1973.
3,772,012.—REVERSAL DEVELOPMENT USING POLAR LIQUID DEVELOPERS. NOV. 13, 1973. BEL. 0777718, CAN. 0949826, FRA. 7201004, GRB. 1374831, ITL. 0946351.
3,776,723.—LIQUID TRANSFER ELECTROPHOTOGRAPHIC DEVELOPMENT PROCESS. DEC. 4, 1973.
3,795,530.—ELECTROSTATIC LATENT IMAGE DEVELOPMENT. MAR. 5, 1974.
3,806,354.—METHOD OF DEVELOPING ELECTROSTATIC LATENT IMAGES. APR. 23, 1974.
3,817,748.—CONTRAST CONTROL IN ELECTROSTATIC COPYING UTILIZING LIQUID DEVELOPMENT. JUNE 18, 1974. GRB. 1406794.
3,834,930.—METHOD OF DEVELOPING ELECTROSTATOGRAPHIC IMAGE. SEPT. 10, 1974.
3,856,519.—TRANSFER OF TONER USING A VOLATILE INSULATING LIQUID. DEC. 24, 1974.
3,900,405.—CASSETTE OPENING MECHANISM. AUG. 19, 1975. CAN. 0926460, GRB. 1362697.
3,907,694.—NON-VOLATILE CONDUCTIVE INKS. SEPT. 23, 1975.
3,907,695.—LIQUID DEVELOPER. SEPT. 23, 1975.
3,918,400.—BLADE MOUNTING ASSEMBLIES. NOV. 11, 1975. BEL. 0816534, FRA. 7421752, GRB. 1419417.
3,918,807.—CLEANING BLADE FOR PHOTOCOPIER. NOV. 11, 1975.
3,942,349.—CROWN DIE FOR THREAD ROLLING OF APPLICATOR ROLLS. MAR. 9, 1976.
3,942,474.—DEVELOPING SYSTEMS. MAR. 9, 1976. ARG. 0181931, ATR. 0311971, AUS. 0457519, BEL. 0752802, CAN. 0904108, CHL. 0026275, EGR. 0084325, FRA. 7024068, GRB. 1320509, ITL. 0894828, JAP. 0815361, MEX. 0116454, SAF. 0704474, SPN. 0381297, STZ. 0513437, SWD. 0357269, TIW. 0006614, VZL. 0033335.
3,954,640.—ELECTROSTATIC PRINTING INKS. MAY 4, 1976. BEL. 0816553, GRB. 1452556.
3,978,817.—PATTERNED GRAVURE AND DOCTORING MEANS THEREFOR. SEPT. 7, 1976. BEL. 0841855.
3,980,404.—XEROGRAPHIC APPARATUS HAVING IMPROVED FLUID DISPENSING MEMBER. SEPT. 14, 1976.
3,985,663.—CONDUCTIVE INKS CONTAINING QUATERNARY AMMONIUM COMPOUNDS. OCT. 12, 1976.
3,993,023.—COATED FILAMENT WOUND INK APPLICATOR ROLL. NOV. 23, 1976.
3,993,024.—FILAMENT WOUND INK APPLICATOR ROLL. NOV. 23, 1976.
3,994,726.—LAMINATED FLEXIBLE PHOTORECEPTOR. NOV. 30, 1976. GRB. 1429517.
4,002,476.—METHOD OF DEVELOPING RESILIENT PHOTOCONDUCTIVE ELEMENT. JAN. 11, 1977. GRB. 1429517.
4,004,931.—CONSTANT VISCOSITY INKS. JAN. 25, 1977.
4,007,983.—IMPROVED LIQUID DEVELOPER CLEANING MEANS. FEB. 15, 1977.
4,017,174.—DEVELOPER ASSEMBLY SUPPORT. APR. 12, 1977.
4,023,967.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPMENT METHOD IN WHICH A UNIFORM SUBSTANTIAL INTERFACE CONTACT. BEL. 0819537, GRB. 1429518.
4,024,292.—PROCESS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES WITH INK. MAY 17, 1977. BEL. 0816553, GRB. 1452556.
4,024,838.—DEVELOPER LIQUID SUPPLY DEVICE. MAY 24, 1977.
4,027,964.—IMAGING METHOD AND APPARATUS. JUNE 7, 1977. ARG. 0190535, BEL. 0777714, CAN. 0949825, FRA. 7201000, GRB. 1374501, ITL. 0946355, MEX. 0124981.

Class 5F

2,843,084.—XEROGRAPHIC APPARATUS WITH ENDLESS DEVELOPMENT ELECTRODE. JULY 15, 1958.
2,844,123.—BELT DEVELOPMENT ELECTRODE. JULY 22, 1958.
2,880,699.—XEROGRAPHIC DEVELOPMENT. APR. 7, 1959.
2,895,847.—ELECTRIC IMAGE DEVELOPMENT. JULY 21, 1959. CAN. 0558894.
2,918,898.—XEROGRAPHIC BELT LOADING APPARATUS. DEC. 29, 1959. CAN. 0611529.
3,124,483.—APPARATUS FOR TRANSFERRING POWDER IMAGES AND METHOD THEREFOR. MAR. 10, 1964. CAN. 0843622.
3,166,432.—IMAGE DEVELOPMENT. JAN. 19, 1965. CAN. 0675704, FRA. 1260844, GER. 1185062, GRB. 0959668, JAP. 0401040.
3,203,394.—XEROGRAPHIC DEVELOPMENT APPARATUS. AUG. 31, 1965. CAN. 0757572, GER. 1497070, GRB. 1026704, JAP. 0464922.
3,216,844.—METHOD OF DEVELOPING ELECTROSTATIC IMAGES WITH PHOTOCONDUCTIBLE DONOR MEMBER. NOV. 9, 1965. CAN. 0794035, GRB. 1024983.
3,301,152.—XEROGRAPHIC COPYING APPARATUS. JAN. 31, 1967.
3,332,396.—XEROGRAPHIC DEVELOPING APPARATUS WITH CONTROLLED CORONA MEANS. JULY 25, 1967. AUS. 0287695, BEL. 0656893, CAN. 0775061, FRA. 1419973, GER. 1288915, GRB. 1060679, ITL. 0745583.
3,375,806.—XEROGRAPHIC DONOR DEVELOPMENT APPARATUS. APR. 2, 1968.
3,376,852.—DIELECTRIC BELT DEVELOPING. APR. 9, 1968. CAN. 0859028, GRB. 1214512, JAP. 0919364.
3,405,682.—XEROGRAPHIC DEVELOPMENT APPTS WITH WEB LOADING MEANS TO REMOVE RESIDUAL DEVELOPER. OCT. 15, 1968. GRB. 1102282.
3,606,864.—DONOR ASSEMBLY. SEPT. 21, 1971. CAN. 0903461, GRB. 1280951, MEX. 0116025.
3,613,636.—ELECTROGRAPHIC DEVELOPER. OCT. 19, 1971. GRB. 1282991.
3,635,196.—PNEUMATICALLY CONTROLLED SEAL. JAN. 18, 1972.
3,645,618.—VACUUM NOZZLE TO REMOVE AGGLOMERATES ON A TONER APPLICATOR. FEB. 29, 1972. CAN. 0949823.
3,696,783.—AUTOMATED TOUCHDOWN DEVELOPMENT SYSTEM. OCT. 10, 1972. CAN. 0949822, GRB. 1373666.
3,696,785.—DEVELOPMENT APPARATUS. OCT. 10, 1972. CAN. 0949824, GRB. 1373665.
3,697,169.—ELECTROSTATIC RECORDING APPARATUS AND METHOD. OCT. 10, 1972. CAN. 0954292, GRB. 1322681.
3,703,157.—MTHD/APPRTS FOR FRMNG UNFRM LYR OF PWDR DVELPR ON A SURFACE. NOV. 21, 1972.
3,707,389.—LATENT ELECTROSTATIC IMAGE DEVELOPMENT. DEC. 26, 1972. AUS. 0457281, BEL. 0777721, CAN. 0949827, FRA. 7201007, GRB. 1375048, ITL. 0946354.
3,729,334.—IMAGING PROCESS. APR. 24, 1973.
3,739,748.—DONOR FOR TOUCHDOWN DEVELOPMENT. JUNE 19, 1973.
3,759,222.—MICROFIELD DONOR WITH CONTINUOUSLY REVERSING MICROFIELDS. SEPT. 18, 1973. BEL. 0780091, CAN. 0951596, FRA. 7208102, GRB. 1385966, ITL. 0949779.
3,848,566.—DONOR APPARATUS. NOV. 19, 1974.

3,866,574.—XEROGRAPHIC DEVELOPING APPARATUS. FEB. 18, 1975, FRA. 7405248, GRB. 1458766.
3,881,927.—HALF TONE DEVELOPMENT PROCESS FOR TOUCHDOWN SYSTEM IN ELECTROSTATIC IMAGING. MAY 6, 1975. GRB. 1419926.
3,884,185.—COATED WIRE DEVELOPER BRUSH. MAY 20, 1975.
3,890,929.—XEROGRAPHIC DEVELOPING APPARATUS. JUNE 24, 1975.
3,893,418.—XEROGRAPHIC DEVELOPING APPARATUS. JULY 8, 1975.
3,900,002.—DONOR APPARATUS. AUG. 19, 1975.
3,914,460.—DEVELOPMENT UTILIZING ELECTRIC FIELDS. OCT. 21, 1975.
3,929,098.—TONER LOADING FOR TOUCHDOWN DONOR. DEC. 30, 1975.
3,970,042.—COLOR DEVELOPMENT APPARATUS. JULY 20, 1976.
3,997,688.—DEVELOPING AN ELECTRICAL IMAGE. DEC. 14, 1976.
3,998,185.—MICROFIELD DONORS WITH TONER AGITATION AND THE METHODS OF THEIR MANUFACTURE. DEC. 21, 1976.
3,999,515.—SELF SPACING MICROFIELD DONORS. DEC. 28, 1976.
3,999,849.—TOUCHDOWN AMBIPOLAR DEVELOPMENT. DEC. 28, 1976.
4,003,333.—DEVELOPMENT SYSTEM. JAN. 18, 1977.
4,006,981.—HALF TONE DEVELOPMENT FOR TOUCHDOWN SYSTEM. FEB. 8, 1977. GRB. 1419926.
4,011,834.—TOUCHDOWN ELECTROSTATIC DEVELOPMENT APPARATUS. MAR. 15, 1977.
4,017,648.—TONER AGITATION THROUGH MICROFIELD DONOR. APR. 12, 1977.
4,025,185.—APPLICATOR MEMBER. MAY 24, 1977. GRB. 1436098.

Class 5G

3,380,437.—TRANSVERSELY RECIPROCATING FLUIDIZED BED DEVELOPMENT APPARATUS. APR. 30, 1968. ARG. 0179553, BRA. 0088502, CAN. 0821491, CHL. 0022941, CLB. 0016330, MEX. 0095936, PRU. 0009315, URG. 0008636, VZL. 0020996.
3,393,663.—FLUIDIZING ELECTRODE DEVELOPMENT APPARATUS. JULY 23, 1968. ARG. 0171118, AUS. 0411962, BEL. 0701467, CAN. 0821472, CHL. 0024009, CLB. 0017645, CZC. 0157025, DNK. 0123998, EGR. 0072982, FRA. 1531274, GRB. 1193443, ISR. 0028298, ITL. 0805956, LXB. 0054062, MEX. 0095697, NOR. 0127834, NZL. 0149432, PLD. 0069038, PTG. 0048069, SAF. 0674268, SPN. 0343103, STZ. 0481406, SWD. 0322414, USR. 0353449, VZL. 0021059.
3,396,700.—XEROGRAPHIC TONER DISPENSING APPARATUS. AUG. 13, 1968. CAN. 0852126, GRB. 1231868, JAP. 0752503.
3,574,660.—ORBITAL DEVELOPER STREAM DEVELOPMENT. APR. 13, 1971. CAN. 0845076, GRB. 1193277.
3,641,977.—APPARATUS FOR AGITATING DEVELOPER MATERIAL WITHIN A HOUSING. FEB. 15, 1972. CAN. 0917405, GRB. 1342684.
3,682,137.—J-SHELL DEVELOPER HOUSING. AUG. 8, 1972. CAN. 0949820, GRB. 1342782.
3,900,001.—DEVELOPING APPARATUS. AUG. 19, 1975. CAN. 0970631, GRB. 1381049.

Class 5H

2,761,416.—DEVELOPMENT MECHANISM FOR ELECTROSTATIC IMAGES. SEPT. 4, 1956.
3,015,304.—ELECTROSTATIC IMAGE REPRODUCTION. JAN. 2, 1962. CAN. 0713395.
3,484,265.—TRANSVERSELY RECIPROCATING FLUIDIZED BED DEVELOPMENT METH. DEC. 16, 1969.
3,503,776.—XEROGRAPHIC DEVELOPMENT. MAR. 31, 1970. CAN. 0828694, FRA. 1511809, GRB. 1182291, ITL. 0793692, MEX. 0098765.
3,611,991.—VIBRATING BED DEVELOPING APPARATUS WITH ELECTROMAGNETIC DEVELOPER AGITATOR. OCT. 12, 1971. AUS. 0445409, BEL. 0755605, CAN. 0911707, EGR. 0083516, FRA. 7032503, GRB. 1264780, ITL. 0907435, JAP. 0745766, SPN. 0383333, STZ. 0521615, SWD. 0361956, TIW. 0007201, USR. 0371738.
3,613,637.—DEVELOPER FOR ELECTROSTATIC IMAGES. OCT. 19, 1971. AUS. 0448238, BEL. 0752034, CAN. 0911702, FRA. 7021987, GRB. 1301157, ITL. 0894180, SWD. 0358975.
3,621,816.—INTERLACED VIBRATING ELECTRODE. NOV. 23, 1971. CAN. 0914397, GRB. 1316614, JAP. 0835102.
3,623,454.—FLUIDIZED BED DEVELOPMENT APPARATUS. NOV. 30, 1971. CAN. 0895208, GRB. 1272373, JAP. 0731616.
3,654,900.—FLUIDIZED DEVELOPMENT OF ELECTROSTATIC IMAGES. APR. 11, 1972. CAN. 0949821, GRB. 1357149.
3,685,486.—FLUIDIZED DEVELOPMENT APPARATUS. AUG. 22, 1972. CAN. 0921693, GRB. 1316306, JAP. 0746925.
3,754,531.—FLUIDIZED DEVELOPMENT APPARATUS. AUG. 28, 1973.
3,844,252.—SHEET REMOVAL DEVICE. OCT. 29, 1974. BEL. 0814943, CAN. 1000749, FRA. 7415957, ITL. 1012669, PNM. 0003193, PTG. 0061701, SPN. 0426423, SWD. 7406337.

Class 5I

3,838,922.—APPARATUS FOR SENSING THE QUANTITY OF RECLAIMED DEVELOPER MATERIAL. OCT. 1, 1974. CAN. 0992600, GRB. 1414319.
3,841,265.—DEVELOPER ASSEMBLY FOR ELECTROSTATIC COPIER. OCT. 15, 1974.
3,844,252.—SHEET REMOVAL DEVICE. OCT. 29, 1974. BEL. 0814943, CAN. 1000749, FRA. 7415957, ITL. 1012669, PNM. 0003193, PTG. 0061701, SPN. 0426423, SWD. 7406337.
3,873,197.—APPARATUS FOR REGULATING THE TONER CONCENTRATION IN A ELECTROPHOTOGRAPHIC DEVICE. MAR. 25, 1975.
3,926,338.—THERMALLY INSENSITIVE PARTICLE CONCENTRATION CONTROLLER. DEC. 16, 1975.

Class 5I 1

3,316,875.—XEROGRAPHIC DEVELOPING APPARATUS. MAY 2, 1967.
3,331,355.—XEROGRAPHIC DEVELOPING APPARATUS. JULY 18, 1967. CAN. 0793224, FRA. 1465811, GRB. 1069351, ITL. 0778708.
3,349,750.—XEROGRAPHIC DEVELOPMENT APPARATUS. OCT. 31, 1967. CAN. 0819050, FRA. 1516053, GRB. 1165377, ITL. 0788953, JAP. 0547202, MEX. 0093862.
3,356,248.—CONTAINER WITH A ROTATABLE CLOSURE. DEC. 5, 1967. CAN. 0825091, GRB. 1166618.
3,550,556.—DEVELOPMENT APPARATUS. DEC. 29, 1970. ARG. 0180677, AUS. 0442279, BEL. 0726571, BRA. 6905449, CAN. 0882576, CZC. 0157055, EGR. 0076888, FRA. 1604314, GRB. 1252494, ITL. 0854006, JAP. 0731247, MEX. 0109983, PNM. 0001770, RMN. 0054558, SAF. 0069180, SPN. 0362037, STZ. 0498431, SWD. 0351059, USR. 0372851, VZL. 0023724.
3,661,118.—ELECTROSTATIC DEVELOPMENT. MAY 9, 1972. CAN. 0951107, GRB. 1359234.
3,662,711.—DEVELOPMENT APPARATUS. MAY 16, 1972. CAN. 0945757, GRB. 1345253.
3,663,291.—CASCADE DEVELOPMENT. MAY 16, 1972.
3,687,270.—CONVEYOR ASSEMBLY. AUG. 29, 1972. CAN. 0952464, GRB. 1376231.
3,717,122.—MAGNETIC GATE. FEB. 20, 1973. CAN. 0960031, GRB. 1377023.
3,943,887.—HYBRID CROSSMIXER. MAR. 16, 1976.
3,947,107.—PARTIALLY SUBMERGED ACTIVE CROSSMIXER. MAR. 30, 1976. BEL. 0835370.
3,973,518.—CROSS MIXING BLENDING CHAMBER FOR ELECTROSTATIC PROCESSORS AND THE LIKE. AUG. 10, 1976.
3,995,590.—BLENDING CHAMBER FOR ELECTROSTATIC PROCESSORS. DEC. 7, 1976.
3,999,512.—ELECTROSTATIC DEVELOPMENT SYSTEM WITH PASSIVE STORAGE CAPACITY. DEC. 28, 1976. BEL. 0823656.

Class 5I 2

3,941,280.—APPARATUS FOR CONTROLLING DEVELOPER EFFICIENCY. MAR. 2, 1976.
3,983,841.—TONER RECLAIM CONVEYOR. OCT. 5, 1976.
4,011,835.—TONER CONVEYOR. MAR. 15, 1977.

Class 5I 2A

2,750,922.—APPARATUS FOR DEVELOPING ELECTROPHOTOGRAPHIC PLATES. JUNE 19, 1956.
2,965,266.—XEROGRAPHIC TONER DISPENSER. DEC. 20, 1960, GRB. 0881609.
3,122,455.—XEROGRAPHIC TONER DISPENSER. FEB. 25, 1964.
3,135,433.—XEROGRAPHIC TONER DISPENSING APPARATUS. JUNE 2, 1964. CAN. 0701240.

3,149,760.—POWDER DISPENSING APPARATUS. SEPT. 22, 1964.
3,250,439.—XEROGRAPHIC TONER DISPENSER. MAY 10, 1966. CAN. 0815453, GRB. 1126197, JAP. 0512654.
3,337,072.—LOADER. AUG. 22, 1967. CAN. 0825092, GRB. 1166619, JAP. 0605648.
3,385,500.—TONER PACKAGE. MAY 28, 1968. CAN. 0864337, GRB. 1189147, JAP. 0931680.
3,619,279.—TONER RECEIVING MEMBER. NOV. 9, 1971.
3,622,054.—TONER DISPENSER IMPROVEMENT. NOV. 23, 1971. CAN. 0911705.
3,722,471.—TONER METER DEVICE. MAR. 27, 1973. CAN. 0951108, GRB. 1370009.
3,740,288.—METHOD OF PREPARING A TONER DISPENSER. JUNE 19, 1973.
3,920,155.—PARTICLE LEVEL INDICATOR. NOV. 18, 1975.
3,924,566.—REPRODUCTION MACHINE WITH MEANS FOR SOLIDIFYING THE RECLAIM TONER. DEC. 9, 1975.
3,941,470.—A TONER PARTICLE DISPENSER. MAR. 2, 1976.
3,951,539.—ELECTROSTATIC REPRODUCTION MACHINE WITH IMPROVED TONER DISPENSING APPARATUS. APR. 20, 1976.
3,954,331.—TONER DISPENSER. MAY 4, 1976.
3,979,022.—MONITORING DEVICE—MAGNETIC POWERED ALARM DEVICE. SEPT. 7, 1976. BEL. 0801607, CAN. 0982841, FRA. 7300103, GRB. 1431574, ITL. 0990693, SWD 7308931.
4,034,701.—PARTICLE DISPENSER0TONER DISPENSER—EPIC. JULY 12, 1977. BEL. 0801243, CAN. 0979209, FRA. 7323735, GRB. 1,438,799, ITL. 0990691, SWD. 7,308,929.

Class 51 2B

2,974,632.—DEVELOPER OF ELECTROSTATIC PHOTOGRAPHY. MAR. 14, 1961. CAN. 0704147.
3,389,863.—XEROGRAPHIC TONER DISPENSER. JUNE 25, 1968. CAN. 0835862, FRA. 1497062, GRB. 1171303, ITL. 0787552, JAP. 0589523, MEX. 0093821, VZL. 0024004.
3,390,664.—XEROGRAPHIC TONER DISPENSING APPARATUS. JULY 2, 1968. CAN. 0852124, GRB. 1208593, JAP. 0608323.
3,619,279.—TONER RECEIVING MEMBER. NOV. 9, 1971.

Class 51 2C

3,951,539.—ELECTROSTATIC REPRODUCTION MACHINE WITH IMPROVED TONER DISPENSING APPARATUS. APR. 20, 1976.
3,956,108.—ANTI-PLUGGING DEVICE FOR AUTOMATIC DEVELOPABILITY CONTROL SYSTEMS. MAY 11, 1976.
3,958,878.—ELECTROSTATIC PROCESSOR HOUSING INTERCHANGABLE RESERVOIRS FOR SUPPING & RECLAIMING TONER. MAY 25, 1976.
3,974,944.—TONER DISPENSER. AUG. 17, 1976.

Class 51 2C 1

RE.27,876.—DISPENSING APPARATUS. JAN. 8, 1974. CAN. 0868818.
3,013,703.—POWDER DISPENSING APPARATUS. DEC. 19, 1961. CAN. 0677935, GRB. 0938501, JAP. 0300276.
3,300,101.—TONER DISPENSER. JAN. 24, 1967. CAN. 0800856, GRB. 1152671, JAP. 0524530.
3,339,807.—TONER CONTAINER AND DISPENSER. SEPT. 5, 1967. CAN. 0842133, GRB. 1165953, JAP. 0547201.
3,396,700.—XEROGRAPHIC TONER DISPENSING APPARATUS. AUG. 13, 1968. CAN. 0852126, GRB. 1231868, JAP. 0752503.
3,453,045.—XEROGRAPHIC DEVELOPMENT APPARATUS. JULY 1, 1969. CAN. 0852125, FRA. 1559973, GRB. 1213493, HUN. 0156188, ITL. 0832847, JAP. 0602169, USR. 0371739.
3,538,887.—ELECTROSCOPIC TONER POWDER DISPENSER. NOV. 10, 1970.
3,542,089.—TONER DISPENSER. NOV. 24, 1970. CAN. 0885916.
3,596,807.—DISPENSING APPARATUS—REISSUED D2184R RE27876. AUG. 3, 1971. CAN 0868818.
3,608,792.—APPARATUS FOR DISPENSING FINELY DIVIDED PARTICULATE MATERIAL. SEPT. 28, 1971. ARG. 0182132, ATR. 0311790, AUS. 0456817, BEL. 0745602, CAN. 0869923, CHL. 0025844, DNK. 0128336, FRA. 7003984, GRB. 1302401, GUA. 0002512, ITL. 0886722, MEX. 0119828, NZL. 0159117, PNM. 0002240, SAF. 0700806, SPN. 0376265, STZ. 0526801, SWD. 7001426, TIW. 0005927, VZL. 0032924.
3,654,900.—FLUIDIZED DEVELOPMENT OF ELECTROSTATIC IMAGES. APR. 11, 1972. CAN. 0949821, GRB. 1357149.
3,655,033.—VIBRATORY BOWL—TONER DISPENSER. APR. 11, 1972.
3,752,576.—TRANSPORT FOR PARTICULATE MATERIAL. AUG. 14, 1973.
3,896,279.—TNE LVL DETCTR ASSEMBLY INC MAGNETICLY RESPONSIVE SWITCH ACTUATD BY DFERENTL LOADED BLADE TYPE. JULY 22, 1975.
3,901,187.—DEVELOPER RETONING APPARATUS. AUG. 26, 1975.
3,920,154.—TONER LEVEL DETECTOR. NOV. 18, 1975.
3,951,539.—ELECTROSTATIC REPRODUCTION MACHINE WITH IMPROVED TONER DISPENSING APPARATUS. APR. 20, 1976.

Class 51 2C 2

3,094,049.—XEROGRAPHIC DEVELOPER MEASURING APPARATUS. JUNE 18, 1963.
3,348,522.—AUTOMATIC TONER CONTROL SYSTEM. OCT. 24, 1967. CAN. 0799397, GRB. 1135743, JAP. 0942998, MEX. 0089292.
3,348,523.—AUTOMATIC TONER CONTROL SYSTEM. OCT. 24, 1967. CAN. 0799399, GRB. 1139299, JAP. 5371200.
3,376,853.—ELECTROSTATIC TONER CONTROL. APR. 9, 1968. CAN. 0819051, GRB. 1177232, JAP. 0568731.
3,376,854.—AUTOMATIC TONER DISPENSING CONTROL—SEE D2425 FOR RE27480. APR. 9, 1968. ARG. 0164003, ATR. 0279352, AUS. 0416453, BEL. 0699115, CAN. 0866349, CHL. 0022942, CLB. 0016441, CZC. 0160633, DNK. 0116114, EGR. 0067870, EIR. 0031100, FRA. 1524678, GRB. 1186775, GRK. 0033692, IND. 0110760, ISR. 0028022, ITL. 0796438, JAP. 0800113, LXB. 0053713, MEX. 0099990, NOR. 0128039, NZL. 0148850, PAK. 0118694, PLD. 0069794, PLP. 0005554, PRU. 0009348, PTG. 0047758, SAF. 0673111, SPN. 0340983, STZ. 0473409, SWD. 6707266, TRK. 0014624, UAR. 0008620, URG. 0008538, USR. 0494887, VZL. 0023661.
3,430,606.—ELECTROSCOPIC PARTICLE SENSOR. MAR. 4, 1969. BEL. 0726274, BRA. 6805010, CAN. 0891683, FRA. 1597321, ITL. 0866513, MEX. 0107599, PNM. 0001400, USR. 0336895, VZL. 0023727.
3,498,500.—LEVEL SENSOR. MAR. 3, 1970. CAN. 0912851, GRB. 1251128, JAP. 0663856.
3,520,445.—DIELECTRIC LEVEL SENSOR. JULY 14, 1970. CAN. 0895527, GRB. 1239856, JAP. 0663857.
3,526,338.—METHOD AND CONTROLLER FOR DISPENSING ELECTROSCOPIC MATERIAL—AUTOMATIC TONER DISPENSER CONTROL—24. SEPT. 1, 1970. ARG. 0181603, AUS. 0436922, BEL. 0726274, BRA. 6804852, CAN. 0895526, GRB. 1216690, ITL. 0866513, JAP. 0752505, MEX. 0107687, PNM. 0001419, SPN. 0362036, SWD. 0355090, USR. 0336895, VZL. 0023723.
3,527,387.—DEVELOPER REPLENISHING PROGRAMMING SYSTEM. SEPT. 8, 1970. CAN. 0922772, GRB. 1233814, JAP. 0758340.
3,536,042.—XEROGRAPHIC DEVELOPMENT APPARATUS. OCT. 27, 1970.
3,604,939.—TONER SENSING APPARATUS—TONER SENSOR ASSEMBLY-GENIE. SEPT. 14, 1971. CAN. 0915751, GRB. 1260379, JAP. 0752502.
3,635,373.—AUTOMATIC DEVELOPABILITY CONTROL APPARATUS. JAN. 18, 1972. ARG. 0190708, AUS. 0445334, BEL. 0760748, CAN. 0923546, CHL. 0025916, EGR. 0091983, FRA. 7047630, GRB. 1336590, GUA. 0002624, ITL. 0913903, JAP. 0795149, MEX. 0116721, PNM. 0002092, SPN. 0386750, STZ. 0524843, SWD. 0362511, TIW. 0007197.
3,659,556.—PROGRAMMABLE TONER DISPENSER. MAY 2, 1972. BEL. 0771423, CAN. 0936681, FRA. 7130743, GRB. 1358448, ITL. 0934010.
3,692,403.—AUTOMATIC CONTROL OF TONER CONCENTRATIONS. SEPT. 19, 1972. CAN. 0979635, GRB. 1409578.
3,693,581.—TONER DISPENSER CIRCUIT FOR ELECTROSTATOGRAPHIC APPARATUS. SEPT. 26, 1972.
3,727,065.—AUTOMATIC DEVELOPABILITY CONTROL SYSTEM. APR. 10, 1973. ARG. 0185080, AUS. 0440458, BEL. 0757430, CAN. 0934806, CHL. 0025915, CZC. 0169811, FGR. 0086755, FRA. 7038235, GRB. 1318895, ITL. 0908953, JAP. 0795148, MEX. 0116873, PNM. 0002179, SPN. 0384593, STZ. 0514168, SWD. 0369114, TIW. 0007196, VZL. 0032004.
3,754,821.—AUTOMATIC DEVELOPMENT CONTROL. AUG. 28, 1973. ARG. 0195188, AUS. 0467463, BEL.

0793425, CAN. 1004725, FRA. 7246724, GRB. 1411448, ITL. 0972845, JAP. 0552838, MEX. 0128209, NZL. 0169419, SAF. 7219030, SPN. 0410096, STZ. 0552838, SWD. 7216891, VZL. 0032066.

3,757,999.—AUTOMATIC DEVELOPABILITY CONTROL SYSTEM FOR ELECTROSTATIC RECORDING APPARATUS. SEPT. 11, 1973. ARG. 0185080, AUS. 0440458, BEL. 0757430, CAN. 0934806, CHL. 0025915, CZC. 0169811, EGR. 0086755, FRA. 7038235, GRB. 1318895, ITL. 0908953, JAP. 0795148, MEX. 0116873, PNM. 0002179, SPN. 0384593, STZ. 0514168, SWD. 0369114, TIW. 0007196, VZL. 0032004.

3,778,146.—ILLUMINATING APPARATUS. DEC. 11, 1973.

3,801,196.—TONER CONCENTRATION REGULATING APPARATUS. APR. 2, 1974.

3,814,516.—HUMIDITY COMPENSATED CONTROL DEVICE. JUNE 4, 1974. CAN. 1012202, GRB. 1458558.

3,825,337.—COLOR BALANCE DISPLAY. JULY 23, 1974. CAN. 1006766.

3,834,806.—PARTICLE LEVEL INDICATOR. SEPT. 10, 1974.

3,872,825.—PARTICLE CONCENTRATION DETECTOR. MAR. 25, 1975. CAN. 1014598.

3,873,002.—TONER DISPENSER LOGIC CONTROL. MAR. 25, 1975. BEL. 0813798, CAN. 1008915, GRB. 1457565, ITL. 1009837.

3,893,408.—TONER DISPENSER SYSTEM. JULY 8, 1975.

3,894,799.—APPARATUS FOR MONITORING COPY QUALITY. JULY 15, 1975.

3,931,792.—ABRASIVE LIQUID DEVELOPING APPARATUS. JAN. 13, 1976.

3,936,176.—DEVICE FOR MAINTAINING A DEVELOPABILITY REGULATING APPARATUS CONTAMINANT FREE. FEB. 3, 1976.

3,960,444.—ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 1, 1976.

3,969,114.—METHOD FOR MONITORING COPY QUALITY. JULY 13, 1976.

3,999,119.—MEASURING TONER CONCENTRATION. DEC. 21, 1976.

4,026,643.—APP & MTHD FOR MEASUREMENT OF THE RTO OF TNR PRTLCS ELCTRSTATC CHRGE TO TNR PRTLE MASS IN ELCTSTC. MAY 31, 1977.

4,032,225.—COPYING MACHINES. JUNE 28, 1977.

Class 5J

3,804,510.—IMAGING DEVELOPING SYSTEM. APR. 16, 1974.

3,889,637.—SELF-BIASED DEVELOPMENT ELECTRODE AND REPRODUCING MACHINE EMPLOYING SAME. JUNE 17, 1975. FRA. 7422700, GRB. 1464886.

3,893,415.—DEVELOPING APPARATUS. JULY 8, 1975. ARG. 0204387, BEL. 0789238, BRA. 0088405, CAN. 0991394, FRA. 7232380, GRB. 1409815, ITL. 0970948, MEX. 0128578, SPN. 0408654, STZ. 0554551, SWD. 7214863, VZL. 0033578.

3,908,037.—IMAGE DEVELOPING TECHNIQUES. SEPT. 23, 1975. CAN. 0980181, GRB. 1406292.

3,965,861.—SEPARATED ROLLER LIQUID DEVELOPMENT. JUNE 29, 1976.

Class 5J 1

2,690,394.—ELECTROPHOTOGRAPHY. SEPT. 28, 1954.

2,777,418.—METHOD AND APPARATUS FOR DEVELOPING AN IMAGE ON A XEROGRAPHIC PLATE. JAN. 15, 1957. CAN. 0587719.

2,876,737.—APPARATUS FOR DEVELOPING ELECTROSTATIC IMAGES ON SHEET MATERIAL. MAR. 10, 1959.

3,011,473.—XEROGRAPHIC APPARATUS. DEC. 5, 1961. CAN. 0675698, GRB. 0971972.

3,091,219.—XEROGRAPHIC DEVELOPING APPARATUS. MAY 28, 1963.

3,147,147.—XEROGRAPHIC DEVELOPING APPARATUS AND ELECTRODE. SEPT. 1, 1964. CAN. 0738918, GRB. 1007167.

3,241,466.—ELECTROSTATIC PHOTOGRAPHY. MAR. 22, 1966.

3,424,131.—ELECTRODED CASCADE DEVELOPMENT SYSTEM. JAN. 28, 1969. CAN. 0848084, FRA. 1463050, GER. 1497214, GRB. 1123618, ITL. 0729637, JAP. 0499007.

3,606,863.—DEVELOPMENT ELECTRODE. SEPT. 21, 1971. CAN. 0905099, GRB. 1296756, JAP. 0774497.

3,611,992.—CLEANUP ELECTRODE. OCT. 12, 1971. CAN. 0916431.

3,642,515.—LIQUID DEVELOPMENT UTILIZING A CURVILINEAR DEVELOPMENT ELECTRODE. FEB. 15, 1972.

3,648,658.—DEVELOPING APPARATUS. MAR. 14, 1972.

3,651,784.—LOW POTENTIAL DEVELOPMENT ELECTRODE. MAR. 28, 1972. CAN. 0917900.

3,670,700.—DEVELOPMENT ELECTRODE. JUNE 20, 1972. ARG. 0185528, ATR. 0324836, AUS. 0445848, BEL. 0752935, CAN. 0916430, CHL. 0025837, DNK. 0126729, EGR. 0085926, FRA. 7024671, GRB. 1304065, IND. 0127310, ITL. 0900194, JAP. 0731613, MEX. 0115164, NOR. 0131437, NZL. 0160642, PLP. 0006295, PNM. 0001951, PTG. 0054071, SAF. 0704531, SPN. 0381380, STZ. 0513439, SWD. 0358976, TIW. 0007161, USR. 0503555, VZL. 30684.

3,741,156.—XEROGRAPHIC DEVELOPMENT APPARATUS. JUNE 26, 1973.

3,778,144.—XEROGRAPHIC DEVELOPMENT ELECTRODE APPARATUS. DEC. 11, 1973. CAN. 0972550, GRB. 1393144.

3,784,299.—DARK DECAY RETARDATION. JAN. 8, 1974.

3,790,397.—RETONING CARRIER BEADS IN THE DEVELOPMENT ZONE. FEB. 5, 1974.

3,795,222.—DEVELOPMENT ELECTRODE SYSTEM. MAR. 5, 1974.

3,816,114.—ELECTRO-PHOTOGRAPHIC METHOD. JUNE 11, 1974.

3,817,212.—ELECTROSTATOGRAPHIC LIQUID DEVELOPMENT APPARATUS. JUNE 18, 1974.

3,832,975.—ELECTROPHOTOGRAPHIC APPARATUS. SEPT. 3, 1974.

3,955,976.—DEVELOPING METHOD IN ELECTROPHOTOGRAPHY-DEVELOPING METHOD IN ELECTROPHOTOGRAPHY. MAY 11, 1976. GRB. 1329143.

Class 5J 2

2,784,694.—SEGMENTED DEVELOPMENT ELECTRODE. MAR. 12, 1957. CAN. 0564484.

3,416,494.—XEROGRAPHIC DEVELOPMENT ELECTRODE. DEC. 17, 1968. CAN. 0882575, GER. 1816690, GRB. 1249664, JAP. 0653014.

3,621,816.—INTERLACED VIBRATING ELECTRODE. NOV. 23, 1971. CAN. 0914397, GRB. 1316614, JAP. 0835102.

Class 5J 3

2,952,241.—DEVELOPER ELECTRODE FOR ELECTROPHOTOGRAPHIC APPARATUS. SEPT. 13, 1960.

3,349,676.—XEROGRAPHIC DEVELOPMENT ELECTRODE APPARATUS. OCT. 31, 1967. CAN. 0814087, FRA. 1473662, GER. 1522685, GRB. 1144766, ITL. 0764006, JAP. 0513609, MEX. 0090133.

3,866,572.—FORAMINOUS ELECTROSTATOGRAPHIC TRANSFER SYSTEM. BEL. 0815546, CAN. 1009503, FRA. 7418641, GRB. 1448386, ITL. 1012842, SPN. 0426760.

Class 5J 4

2,911,944.—XEROGRAPHIC DEVELOPMENT APPARATUS. NOV. 10, 1959. CAN. 0603099.

2,942,573.—XEROGRAPHIC DEVELOPING APPARATUS. JUNE 28, 1960. CAN. 0701146, GRB. 0930072.

3,062,178.—XEROGRAPHIC DEVELOPING APPARATUS. NOV. 6, 1962.

3,105,777.—XEROGRAPHIC DEVELOPING APPARATUS. OCT. 1, 1963. CAN. 0700762.

Class 5J 5

2,784,109.—METHOD FOR DEVELOPING ELECTROSTATIC IMAGES. MAR. 5, 1957. CAN. 0558593, GRB. 0698994.

2,873,721.—MICRO-MANIFOLD FOR POWDER CLOUD DEVELOPMENT. FEB. 17, 1959.

3,284,224.—CONTROLLED XEROGRAPHIC DEVELOPMENT. NOV. 8, 1966. CAN. 0751349, GRB. 1038801, JAP. 0640353.

3,438,705.—AUTOMATIC XEROGRAPHIC DEVELOPMENT CONTROL. APR. 15, 1969. GRB. 1207830.

3,611,982.—DEVELOPMENT ELECTRODE CONTROL APPARATUS. OCT. 12, 1971. ARG. 0185532, AUS. 0450067, BEL. 0755383, BRA. 0088402, CAN. 0913353, CHL. 0025834, EGR. 0090283, FRA. 7032350, GRB. 1303148, ITL. 0901777, JAP. 0758461, MEX. 0117918, PLD. 80986, PNM. 0002245, SPN. 0383058, STZ. 0523526, SWD. 0361750, TIW. 0007514, USR. 0473382, VZL. 0032598.

3,696,784.—XEROGRAPHIC DEVELOPMENT APPARATUS. OCT. 10, 1972. BEL. 0776601, CAN. 0951109, FRA. 7146241, GRB. 1369648, ITL. 0943905.

3,719,169.—PLURAL ELECTRODE DEVELOPMENT APPARATUS. MAR. 6, 1973. CAN. 0979299, GRB. 1381910.
3,784,397.—IMAGING SYSTEM. JAN. 8, 1974.
3,788,739.—IMAGE COMPENSATION METHOD AND APPARATUS FOR ELECTROPHOTOGRAPHIC DEVICES. JAN. 29, 1974.
3,805,739.—CONTROLLING MULTIPLE VOLTAGE LEVELS FOR ELECTROSTATIC PRINTING. APR. 23, 1974. CAN. 0972552, GRB. 1382710.
3,810,165.—ELECTRONIC DISPLAY DEVICE. MAY 7, 1974.
3,815,988.—IMAGE DENSITY CONTROL APPARATUS. JUNE 11, 1974. ARG. 0205710, BEL. 0815209, FRA. 7416693, GRB. 1458707, ITL. 1012346, SAF. 0743132.
3,818,864.—IMAGE DEVELOPING APPARATUS. JUNE 25, 1974. CAN. 0980181, GRB. 1406292.
3,888,666.—REVERSAL DEVELOPING METHOD USING PHOTOCONDUCTIVE DEVELOPING ELECTRODE. JUNE 10, 1975.
3,889,637.—SELF-BIASED DEVELOPMENT ELECTRODE AND REPRODUCING MACHINE EMPLOYING SAME. JUNE 17, 1975. FRA. 7422700, GRB. 1464886.

Class 5K

2,598,732.—ELECTROPHOTOGRAPHY. JUNE 3, 1952.
3,212,889.—XEROGRAPHIC CONTRAST CONTROL. OCT. 19, 1965. GRB. 1008897.
3,251,685.—METHOD OF CONTROLLING CONTRAST IN A XEROGRAPHIC REPRODUCTION PROCESS. MAY 17, 1966. CAN. 0707047, GER. 1265583, JAP. 0446813.
3,540,806.—HALF TONING METH AND APPARATUS FOR SOLID AREA COVERAG. NOV. 17, 1970. CAN. 0892754, GRB. 1253888.
3,669,072.—DEVELOPER APPARATUS. JUNE 13, 1972. CAN. 0930539, GRB. 1343141.
3,707,947.—CROSS-CHANNEL MIXER. JAN. 2, 1973. ARG. 0200109, ATR. 0322982, AUS. 0457444, BEL. 0776661, CAN. 0946145, CHL. 0027259, DNK. 0132048, EGR. 0099026, FRA. 7145340, GRB. 1372731, ITL. 0943876, MEX. 0127352, PNM. 0002585, SAF. 0718308, SPN. 0397852, STZ. 0557554, TIW. 0005832, USR. 0402245.
3,808,026.—LIQUID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGE. APR. 30, 1974.
3,817,748.—CONTRAST CONTROL IN ELECTROSTATIC COPYING UTILIZING LIQUID DEVELOPMENT. JUNE 18, 1974. CAN. 0991246, GRB. 1406794.
3,865,080.—TONER PICKOFF APPARATUS. FEB. 11, 1975. GRB. 1430876.
3,865,612.—XEROGRAPHIC DEVELOPMENT METHOD. FEB. 11, 1975.
3,887,367.—METHOD FOR TEMPERATURE STABILIZING PHOTORECEPTORS. JUNE 3, 1975.
3,889,637.—SELF-BIASED DEVELOPMENT ELECTRODE AND REPRODUCING MACHINE EMPLOYING SAME. JUNE 17, 1975. FRA. 7422700, GRB. 1464886.
3,893,413.—XEROGRAPHIC DEVELOPING APPARATUS. JULY 8, 1975.
3,911,865.—TONER PICKOFF APPARATUS. OCT. 14, 1975.
3,946,920.—VACUUM SYSTEM CONTROL. MAR. 30, 1976.
3,960,444.—ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 1, 1976.
3,965,861.—SEPARATED ROLLER LIQUID DEVELOPMENT. JUNE 29, 1976.
3,994,725.—MEANS FOR ENHANCING REMOVAL OF BACKGROUND TONER PARTICLE. NOV. 30, 1976.
3,997,259.—APPARATUS FOR REDUCING IMAGE BACKGROUND IN ELECTROSTATIC REPRODUCTION MACHINES. DEC. 14, 1976.
4,023,900.—VARIABLE SPEED LIQUID DEVELOPMENT ELECTROSTATOGRAPHIC APPARATUS. MAY 17, 1977.

Class 5L

2,901,374.—DEVELOPMENT OF ELECTROSTATIC IMAGE AND APPARATUS THEREFOR. AUG. 25, 1959. CAN. 0565027.
3,245,823.—ELECTROSTATIC IMAGE DEVELOPMENT APPARATUS. APR. 12, 1966.
3,926,824.—ELECTROSTATOGRAPHIC DEVELOPER COMPOSITION. DEC. 16, 1975. ARG. 0192480, AUS. 0466319, BEL. 0793098, CAN. 0985552, FRA. 7245403, GRB. 1417179, ITL. 0973327, SPN. 0410171, STZ. 0028663, SWD. 7216977.

Class 5M

2,817,598.—CONTINUOUS TONE REVERSAL DEVELOPMENT PROCESS. DEC. 24, 1957. CAN. 0574108, FRA. 1146729, GER. 1026620, GRB. 0813915, JAP. 0247824.
3,712,728.—REVERSAL DEVELOPMENT. JAN. 23, 1973. BEL. 0777718, CAN. 0949826, FRA. 7201004, GRB. 1374831, ITL. 0946351.
3,772,012.—REVERSAL DEVELOPMENT USING POLAR LIQUID DEVELOPERS. NOV. 13, 1973. BEL. 0777718, CAN. 0949826, FRA. 7201004, GRB. 1374831, ITL. 0946351.
3,800,744.—ELECTROSTATIC LATENT IMAGE DEVELOPING APPARATUS. APR. 2, 1974.
3,877,963.—REVERSAL LIQUID DEVELOPING USING A DEVELOPMENT ELECTRODE AND CORONA CHARGING. APR. 15, 1975.
3,888,666.—REVERSAL DEVELOPING METHOD USING PHOTOCONDUCTIVE DEVELOPING ELECTRODE. JUNE 10, 1975.
3,901,698.—METHOD OF REVERSAL DEVELOPMENT USING TWO ELECTROSTATIC DEVELOPERS. AUG. 26, 1975.

Class 5N

2,822,779.—DEVELOPER FOR ELECTROSTATIC PHOTOGRAPHY. FEB. 11, 1958. CAN. 0560056.
3,907,693.—LIQUID DEVELOPER FOR ELECTROPHOTOGRAPHY. SEPT. 23, 1975.
3,907,694.—NON-VOLATILE CONDUCTIVE INKS. SEPT. 23, 1975.
3,954,640.—ELECTROSTATIC PRINTING INKS. MAY 4, 1976. BEL. 0816553, GRB. 1452556.
3,963,486.—ELECTROPHOTOGRAPHIC IMAGING PROCESS EMPLOYING EPOXY-ESTER CONTAINING LIQUID DEVELOPER. JUNE 15, 1976.
4,024,292.—PROCESS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES WITH INK. MAY 17, 1977. BEL. 0816553, GRB. 1452556.

Class 5N 1A

2,919,247.—TRIPARTITE DEVELOPER FOR ELECTROSTATIC IMAGES. DEC. 29, 1959. CAN. 0565006.
2,965,573.—XEROGRAPHIC DEVELOPER. DEC. 20, 1960. CAN. 0612918, GRB. 0934406.
3,609,082.—ELECTROSTATIC DEV PARTICLS CONTAING RESIN, COLORANT, METAL SALT AND PHTHALATE. SEPT. 28, 1971. ARG. 0165457, BAH. 0000094, BOL. 3389B, CAN. 0902985, CHL. 0023567, CLB. 0017680, DOR. 0001462, ECD. 0000168, ELS. 0001065. JAM. 0001897, MEX. 0100808, PNM. 0002016, PRU. 0009862, TRK. 0015594, URG. 0009288.
3,720,617.—AN ELECTROSTATIC DEVELOPER CONTAINING MODIFIED SILICON DIOXIDE PARTICLES. MAR. 13, 1973. ARG. 0189666, ATR. 0321104, AUS. 0463862, BEL. 0767359, CAN. 0941212, CHL. 0026780, EGR. 0093928, FRA. 7118950, GRB. 1347318, ITL. 0926884, MEX. 2131403, NZL. 0163670, PNM. 0002393, PRU. 0011824, STZ. 0567746, SWD. 0366402, TIW. 0006149, USR. 0460634, VZL. 0032423.
3,819,367.—IMAGING SYSTEM. JUNE 25, 1974. ARG. 0189666, ATR. 0321104, AUS. 0463862, BEL. 0767359, CAN. 0941212, CHL. 0026780, EGR. 0093928, FRA. 7118950, GRB. 1347318, ITL. 0926884, MEX. 0131403, NZL. 0163670, PNM. 0002393, PRU. 0011824, STZ. 0567746, SWD. 0366402, TIW. 0006149, USR. 0460634, VZL. 0032423.
3,820,986.—LIQUID DEVELOPMENT METHOD AND MATERIALS. JUNE 28, 1974.
3,833,364.—METHOD OF DEVELOPING ELECTROSTATIC IMAGE CHARGE. SEPT. 3, 1974.
3,850,830.—LIQUID DEVELOPER CONTAINING EXTENDER BODY PARTICLES. NOV. 26, 1974.
3,900,588.—NON-FILMING DUAL ADDITIVE DEVELOPER. AUG. 19, 1975. BEL. 0825924.

Class 5N 1B

3,013,890.—PROCESS OF DEVELOPING ELECTROSTATIC IMAGES AND COMPOSITION THEREFOR. DEC. 19, 1961. AUS. 0243022, CAN. 0812526, FRA. 1251476, GER. 1129511, GRB. 0944401, ITL. 0620433, JAP. 0313573.
3,577,345.—SOLID XEROGRAPHIC DEVELOPER. MAY 4, 1971. ARG. 0172448, ATR. 0325417, AUS. 0424173, BAH. 0000095, BEL. 0716084, BOL. 003270B, CAN. 0902983, CHL. 0025923, CLB. 0017674, DOR. 0001461, ELS. 0001064, FRA. 1567731, GRB. 1232117, GRK. 0037628, GUA. 0002003, HOL. 0148714, IND. 0116209, ISR. 0030116, ITL. 0851653, JAM. 0001848, JAP. 0623002, LXB. 0056197, MEX. 0119320, NOR. 0131653, NZL. 0164353, PNM. 0002062, PRU. 0009911, PTG. 0049749, SPN. 0354686, STZ. 0516180, SWD. 0338238,

TIW. 0005096, TRD. 0000057, TRK. 0015620, URG. 0009286, VZL. 0023666.

3,590,000.—SOLID DEVELOPER FOR LATENT ELECTROSTATIC IMAGES. JUNE 29, 1971. ARG. 0172453, ATR. 0288860, AUS. 0480033, BAH. 0000093, BEL. 0716083, BOL. 3399B, CAN. 0902984, CHL. 0024050, DOR. 0001460, ECD. 0000198, ELS. 0001062, FRA. 1567721, GER. 1772570, GRB. 1232118, GRK. 0037629, GUA. 0002095, HOL. 0151523, IND. 0116210, ISR. 0030117, ITL. 0851651, JAM. 0002094, JAP. 0655407, LXB. 0056196, MEX. 0104566, NZL. 0164356, PLP. 0007690, PNM. 0002083, PRU. 0009495, PTG. 0049748, SPN. 0354685, STZ. 0519737, SWD. 0357071, TIW. 0004940, TRD. 0000058, TRK. 0015606, URG. 0009287, VZL. 0032392.

3,609,082.—ELECTROSTATIC DEV PARTICLS CONTAING RESIN, COLORANT, METAL SALT AND PHTHALATE. SEPT. 28, 1971. ARG. 0165457, BAH. 0000094, BOL. 3389B, CAN. 0902985, CHL. 0023567, CLB. 0017680, DOR. 0001462, ECD. 0000168, ELS. 0001065, JAM. 0001897, MEX. 0100808, PNM. 0002016, PRU. 0009862, TRK. 0015594, URG. 0009288.

3,635,704.—IMAGING SYSTEM. JAN. 18, 1972. ALB. 0004133, ARG. 0176978, ATR. 0303521, AUS. 0440759, BEL. 0727560, BRA. 0088093, BUR. 0000042, CAM. 0000463, CAN. 0867697, CHL. 0026254, COR. 000949A, DNK. 0131403, EGR. 0078899, EIR. 0032632, FRA. 6902174, GNR. 0000042, GRB. 1259514, GRK. 0039240, IND. 0119583, ISR. 0031503, ITL. 0871510, LAS. 0000199, LIB. 00P7269, LXB. 0057849, MEX. 0106332, MLG. 0003056, MLW. 00MW869, MNC. 8156975, MRC. 0014724, NZL. 0155208, PAK. 0120859, PLP. 0008511, PNM. 0001676, PRU. 0010443, PTG. 0051063, RHD. 4169529, RMN. 0055464, SAF. 0069995, SPN. 0363127, STZ. 0513431, SWD. 0342921, SYA. 0002477, TGR. 0000551, TIW. 0005257, UAR. 0009525, USR. 0396887, VTM. 0001805, VZL. 0023744, ZMB. 0186974.

3,652,319.—CYCLIC IMAGING SYSTEM. MAR. 28, 1972. AUS. 0441527, BEL. 0761029, CAN. 0944010, FRA. 7047634, GRB. 1336739, ITL. 0913957, JAP. 0771819, SWD. 0363175.

3,653,893.—IMAGING SYSTEM. APR. 4, 1972.

3,655,374.—IMAGING PROCESS EMPLOYING NOVEL SOLID DEVELOPER MATERIAL. APR. 11, 1972.

3,681,107.—DEVELOPMENT OF ELECTROSTATOGRAPHIC IMAGES. AUG. 1, 1972.

3,748,127.—TREATMENT OF REUSABLE PHOTOCONDUCTIVE SURFACES WITH LEWIS ACIDS OR BASES. JULY 24, 1973.

3,820,778.—VACUUM STRIPPING ROLL WITH ROTARY PICKUP SLOTS. JUNE 28, 1974. CAN. 1010081, GRB. 1430856.

3,856,692.—LIQUID ELECTROSTOGRAPHIC DEVELOPER COMPOSITIONS. DEC. 24, 1974. CAN. 0940361, GRB. 1332674.

3,900,588.—NON-FILMING DUAL ADDITIVE DEVELOPER. AUG. 19, 1975. BEL. 0825924, SPN. 0435074.

3,900,589.—AN ELECTROSTATOGRAPHIC IMAGING PROCESS. AUG. 19, 1975. AUS. 0467835, BEL. 0802879, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 0417382.

3,948,654.—ELECTROSTATOGRAPHIC PROCESS. APR. 6, 1976.

3,983,045.—THREE COMPONENT DEVELOPER COMPOSITION. SEPT. 28, 1976. ARG. 0194232, ATR. 0334199, AUS. 0462045, BEL. 0789987, CHL. 0027625, FRA. 7236617, GRB. 1402009, ITL. 0968815, MEX. 0125231, NZL. 0168638, PNM. 0002796, SAF. 0727225, SPN. 0407564, STZ. 0028096, SWD. 7213035, TIW. 0007666, VZL. 0012802.

4,002,570.—ELECTROPHOTOGRAPHIC DEVELOPER WITH POLYVINYLLIDENE FLUORIDE ADDITIVE. JAN. 11, 1977.

Class 5N 2

2,618,551.—DEVELOPER FOR ELECTROSTATIC IMAGES. NOV. 18, 1952. AUS. 0148642, CAN. 0495360, GER. 0926587, GRB. 0686466, STZ. 0292431, SWD. 0161100.

2,618,552.—DEVELOPMENT OF ELECTROPHOTOGRAPHIC IMAGES. NOV. 18, 1952.

2,638,416.—DEVELOPER COMPOSITION FOR DEVELOPING AN ELECTROSTATIC LATENT IMAGE. MAY 12, 1953. AUS. 0149163, BEL. 0488778, CAN. 0507733, FRA. 0985322, GER. 0833608, GRB. 0679715, HOL. 0084987, ITL. 0453731, JAP. 0191247, SAF. 0007764, STZ. 0286147, SWD. 0150223.

3,844,815.—FORON YELLOW AS A TONER COLORANT. OCT. 29, 1974. BEL. 808754, CAN. 1003264, FRA. 7345058, ITL. 1000870.

Class 5N 2A

3,723,114.—THERMOSETTING ELCTRSTGRPHC DVLPR OF CARRIER/PREPOLYMER OF DIALLYL PHTHALATE ISOPHTHALATE AND MXTR. MAR. 27, 1973. ARG. 0185089, BEL. 0762507, CAN. 0970195, FRA. 7104349, GRB. 1344197, ITL. 0918244, MEX. 0122234.

3,806,339.—LIQUID DEVELOPER COMPOSITION. APR. 23, 1974.

3,900,800.—HIGH VOLTAGE AMPLIFIER. AUG. 19, 1975.

3,903,320.—ELECTROSTATOGRAPHIC DEVELOPMENT METHOD FOR PRESSURE FIXABLE TONERS. SEPT. 2, 1975.

3,909,259.—COLOR ELECTROPHOTOGRAPHIC IMAGING PROCESS UTILIZING SPECIFIC CARRIER-TOWER COMBINATIONS. SEPT. 30, 1975. CAN. 1005678, FRA. 7345057, GRB. 1435218.

3,942,979.—IMAGING SYSTEM. MAR. 9, 1976.

3,965,021.—ELECTROSTATOGRAPHIC DEVELOPMENT-POLYBLEND TONERS. JUNE 22, 1976.

3,967,962.—DEVELOPING WITH TONER POLYMER HAVING CRYSTALLINE AND AMORPHOUS SEGMENTS. JULY 6, 1976.

3,969,251.—DEVELOPER MIXTURE. JULY 13, 1976.

4,013,572.—HYBRID FIX SYSTEM INCORPORATING PHOTOGRADABLE POLYMERS. MAR. 22, 1977.

Class 5N 2A 1

RE.25,136.—ELECTROSTATIC DEVELOPER COMPOSITION AND METHOD THEREFOR-RE OF 2,940,934-D432. MAR. 13, 1962.

2,788,288.—RHEINFRANK JJ JONES WD. APR. 9, 1957. CAN. 0550574, GRB. 0768293.

2,892,794.—ELECTROSTATIC DEVELOPER AND TONER. JUNE 30, 1959.

2,940,934.—ELECTROSTATIC DEVELOPER COMPOSITION & METHOD THEREFOR—SEE D670 FOR RE25136. JUNE 14, 1960.

3,079,342.—ELECTROSTATIC DEVELOPER COMPOSITION AND METHOD THEREFOR. FEB. 26, 1963. ARG. 0157131, CAN. 0726134, GUA. 0001817.

3,239,465.—XEROGRAPHIC DEVELOPER. MAR. 8, 1966. CAN. 0630295, GRB. 0952166.

Class 5N 2A 2

2,659,670.—METHOD OF DEVELOPING ELECTROSTATIC IMAGES. NOV. 17, 1953.

2,753,308.—XEROGRAPHY DEVELOPER COMPOSITION. JULY 3, 1956.

3,239,465.—XEROGRAPHIC DEVELOPER. MAR. 8, 1966. CAN. 0630295, GRB. 0952166.

Class 5N 2B

3,533,835.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURE. OCT. 13, 1970. ARG. 0181296, AUS. 0417746, BEL. 0704918, CAN. 0900769, CHL. 0024909, CLB. 0017825, FRA. 1540695, GRB. 1211865, IND. 0112449, ITL. 0814857, MEX. 0100137, PRU. 0009323, SWD. 0323583, URG. 0009011, VZL. 0023668.

3,591,503.—ELECTROSTATOGRAPHIC DEVELOPER. JULY 6, 1971. ARG. 0172143, ATR. 0287491, AUS. 0418556, BEL. 0713751, CAN. 0879020, CHL. 0024256, CLB. 0017933, FRA. 1560849, GRB. 1225980, GRK. 0038397, IND. 0115457, ITL. 0833710, LXB. 0055904, MEX. 0111625, NOR. 0128297, NZL. 0152196, PLP. 0008847, PRU. 0009319, PTG. 0049455, SAF. 0682386, SPN. 0352810, STZ. 0508903, SWD. 0333868, URG. 0009139, VZL. 0023688.

3,595,794.—ELECTROSTATOGRAPHIC DEVELOPER. JULY 27, 1971. ARG. 0169109, ATR. 0290986, AUS. 0418156, BEL. 0713752, CAN. 0879021, CHL. 0024482, FRA. 1582855, GRB. 1227471, IND. 0115458, ITL. 0883043, LXB. 0055894, MEX. 0115899, NOR. 0128036, NZL. 0152195, PLP. 0007966, PRU. 0009335, PTG. 0049154, SAF. 0682358, SPN. 0352811, STZ. 0505410, SWD. 0331633, URG. 0009283, VZL. 0023687.

3,627,522.—DEVELOPER COMPOSITION AND METHOD OF USE. DEC. 14, 1971.

3,672,928.—ELECTROSTATOGRAPHIC DEVELOPERS HAVING CARRIERS COMPRISING POLYSTER COATED CORES. JUNE 27, 1972. ARG. 0184669, BEL. 0762415, CAN. 0941209, FRA. 7103845, GRB. 1344365, ITL. 0918191, JAP. 0764506.

3,704,066.—REFLEX ESPOSURE MEDIUM. NOV. 28, 1972.

3,725,283.—ELECTROSTATOGRAPHIC DEVELOPER CONTAINING UNCOATED GLASS CERAMIC CARRIER PARTICLES. APR. 3, 1973. BEL. 0777720, CAN. 0973745, FRA. 7201006, GRB. 1376457, ITL. 0946358.

3,767,578.—CARRIER MATERIAL FOR ELECTROSTATOGRAPHIC. OCT. 23, 1973. ARG. 0198052, ATR. 0322978, AUS. 0461667, BEL. 0784452, CAN. 0986351, CHL. 0027640, FRA. 7220690, GRB. 1397445, ITL. 0959791, MEX. 0127643, SPN. 0403664, STZ. 0546969, SWD. 7207389, TIW. 0006042, VZL. 0032064.

3,847,604.—ELECTROSTATIC IMAGING PROCESS USING MODULAR CARRIERS. NOV. 12, 1974. ARG. 0198052, ATR. 0322978, AUS. 0461667, BEL. 0784452, CAN. 0986351, CHL. 0027640, FRA. 7220690, GRB. 1397445, ITL. 0959791, MEX. 0127643, SPN. 0403664, STZ. 0546969, SWD. 7207389, TIW. 0006042, VZL. 0032064.

3,849,127.—AN ELECTROSTATOGRAPHIC PROCESS IN WHICH COATED CARRIER PARTICLES ARE USED. NOV. 19, 1974.

3,857,792.—ELECTROSTATIC DEVELOPER MIXTURE WITH A COATED CARRIER. DEC. 31, 1974.

3,914,181.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURES COMPRISING FERRITE CARRIER BEADS. OCT. 21, 1975. ARG. 0194244, AUS. 0471676, BEL. 0785913, CAN. 1000477, GRB. 1398871, ITL. 0962400, MEX. 0126285, SPN. 0404423, VZL. 0032940.

3,923,503.—ELECTROSTATIC LATEN IMAGE DEVELOPMENT EMPLOYING STEEL CARRIER PARTICLES. DEC. 2, 1975. ARG. 0181848, ATR. 0316987, AUS. 0456820, BAH. 0000162, BEL. 0752230, CAN. 0940360, CHL. 0025833, EGR. 0095180, FRA. 7021985, GRB. 1312806, ITL. 0894287, JAP. 0728825, MEX. 0121681, NOR. 0131364, NZL. 0160479, PLD. 0081013, PNM. 0002264, PTG. 0053978, SAF. 0704155, SPN. 0380913, STZ. 0548625, SWD. 0351058, TIW. 0006837, USR. 0457235.

3,926,824.—ELECTROSTATOGRAPHIC DEVELOPER COMPOSITION. DEC. 16, 1975. ARG. 0192480, AUS. 0466319, BEL. 0793098, CAN. 0985552, FRA. 7245403, GRB. 1417179, ITL. 0973327, SPN. 0410171, STZ. 0028663, SWD. 7216977.

3,939,086.—HIGHLY CLASSIFIED OXIDIZED DEVELOPER MATERIAL. FEB. 17, 1976. ARG. 0181848, ATR. 0316987, AUS. 0456820, BAH. 0000162, BEL. 0752230, CAN. 0940360, CHL. 0025833, EGR. 0095180, FRA. 7021985, GRB. 1312806, ITL. 0894287, JAP. 0728825, MEX. 0121681, NOR. 0131364, NZL. 0160479, PLD. 0081013, PNM. 0002264, PTG. 0053978, SAF. 0704155, SPN. 0380913, STZ. 0548625, SWD. 0351058, TIW. 0006837, USR. 0457235.

3,942,979.—IMAGING SYSTEM. MAR. 9, 1976.

3,969,251.—DEVELOPER MIXTURE. JULY 13, 1976.

4,018,601.—ELECTROSTATOGRAPHIC MAGNETIC BRUSH IMAGING PROCESS EMPLOYING CARRIER BEADS COMPRISING HIGH NICK. APR. 19, 1977.

Class 5N 3

2,891,011.—DEVELOPER FOR ELECTROSTATIC IMAGES. JUNE 16, 1959.

Class 5N 4

3,467,634.—ORGANOSILICON TERPOLYMERS AND PROCESS. SEPT. 16, 1969. ARG. 0165758, AUS. 0417109, BEL. 0702403, BRA. 6790950, CAN. 0857389, FRA. 1534183, GRB. 1200756, HOL. 0826202, ITL. 0826202, JAP. 0671041, MEX. 0100136, NOR. 0125392, SPN. 0343902, STZ. 0484210, SWD. 0339752, VZL. 0025437.

3,526,533.—COATED CARRIER PARTICLES. SEPT. 1, 1970. ARG. 0161341, AUS. 0418867, BEL. 0702404, CAN. 0878413, FRA. 1534184, GRB. 1205051, ITL. 0826203, JAP. 0578401, MEX. 0120334, NOR. 0122818, SPN. 0343903, STZ. 0486054, SWD. 0308987, VZL. 0032393.

3,533,835.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURE. OCT. 13, 1970. ARG. 0181296, AUS. 0417746, BEL. 0704918, CAN. 0900769, CHL. 0024909, CLB. 0017825, FRA. 1540695, GRB. 1211865, IND. 0112449, ITL. 0814857, MEX. 0100137, PRU. 0009323, SWD. 0323583, URG. 0009011, VZL. 0023668.

3,713,819.—XEROGRAPHIC IMAGING AND DEVELOPMENT USING METAL OXIDE CARRIER PART. JAN. 30, 1973.

3,730,707.—METHOD OF DEVELOPING LATENT IMAGES. MAY 1, 1973.

3,752,666.—ELECTROSTATIC IMAGING PROCESS USING CARRIER BEADS CONTAINING CONDUCTIVE PARTICLES. AUG. 14, 1973.

3,833,366.—CARRIER COMPOSITIONS. SEPT. 3, 1974. BEL. 0748633, CAN. 0904641, FRA. 7012584, GRB. 1319787, ITL. 0899337, JAP. 0709043.

3,839,029.—ELECTROSTATOGRAPHIC DEVELOPMENT WITH FERRITE DEVELOPER MATERIALS. OCT. 1, 1974. ARG. 0194244, AUS. 0471676, BEL. 0785913, CAN. 1000477, GRB. 1398871, ITL. 0962400, MEX. 0126285, SPN. 0404423, VZL. 0032940.

3,849,182.—HIGHLY SHAPE-CLASSIFIED OXIDIZED LOW CARBON HYPEREUTECTOID ELECTROSTATOGRAPHIC STEEL CARRIER PA. NOV. 19, 1974. ARG. 0181848, ATR. 0316987, AUS. 0456820, BAH. 0000162, BEL. 0752230, CAN. 0940360, CHL. 0025833, EGR. 0095180, FRA. 7021985, GRB. 1312806, ITL. 0894287, JAP. 0728825, MEX. 0121681, NOR. 0131364, NZL. 0160479, PLD. 0081013, PNM. 0002264, PTG. 0053978, SAF. 0704155, SPN. 0380913, STZ. 0548625, SWD. 0351058, TIW. 0006837, USR. 0457235.

3,850,663.—CELLULOSE COATED CARRIERS. NOV. 26, 1974. ARG. 0183677, AUS. 0458322, BEL. 0763987, CAN. 0941210, EGR. 0091603, FRA. 7108585, GRB. 1345027, ITL. 0922292, MEX. 0120027, PNM. 0002440, SAF. 0711547, STZ. 0557050, SWD. 0359940, TIW. 0008177, VZL. 0032931.

3,850,676.—COATED CARRIER PARTICLES FOR ELECTROSTATOGRAPHIC DEVELOPMENT. NOV. 26, 1974.

3,900,587.—IMAGING PROCESS EMPLOYING TREATED CARRIERS PARTICLES. AUG. 19, 1975.

3,903,320.—ELECTROSTATOGRAPHIC DEVELOPMENT METHOD FOR PRESSURE FIXABLE TONERS. SEPT. 2, 1975.

3,916,064.—DEVELOPER MATERIAL. OCT. 28, 1975.

3,916,065.—ELECTROSTATOGRAPHIC CARRIER PARTICLES. OCT. 28, 1975.

3,929,657.—STOICHIOMETRIC FERRITE CARRIERS. DEC. 30, 1975. BEL. 0819535.

3,945,823.—ELECTROSTATOGRAPHIC REVERSAL DEVELOPMENT WITH DEVELOPER COMPRISING POLY(P-XYLYLENE) COATED CARR. MAR. 23, 1976. BEL. 0807597, CAN. 1003262, GRB. 1453595, MEX. 0133543, SPN. 0420696.

3,947,371.—DEVELOPER MATERIAL WITH POLYPXYLYLENE-COATED CARRIER. MAR. 30, 1976. BEL. 0807597, CAN. 1003262, GRB. 1453595, MEX. 0133543, SPN. 0420696.

3,989,648.—IMAGING SYSTEM. NOV. 2, 1976. CAN. 1007923.

3,996,392.—HUMIDITY-INSENSIVE FERRITE DEVELOPER MATERIALS. DEC. 7, 1976. BEL. 0847571.

4,007,293.—MECHANICALLY VIABLE DEVELOPER MATERIALS. FEB. 8, 1977.

4.019,903.—ELECTROSTATIC DEVELOPMENT. APR. 26, 1977. BEL. 0777715, CAN. 0973746, FRA. 7201001, GRB. 1376456, ITL. 0946359.

4,035,520.—IMAGING SYSTEMS. JULY 12, 1977.

Class 5N 5

3,788,994.—PRESSURE FIXABLE ELECTROSTATOGRAPHIC TONER. JAN. 29, 1974. ARG. 0200575, BEL. 0793247, CAN. 0985943, FRA. 7244381, GRB. 1406687, ITL. 0973323, SPN. 0410212, STZ. 0028529, VZL. 0032608.

3,804,764.—ELECTROSTATOGRAPHIC PRESSURE SENSITIVE POLYMERIC TONER. APR. 16, 1974. ARG. 0196320, AUS. 0464392, BEL. 0793554, CAN. 1011149, FRA. 7246575, GRB. 1417409, ITL. 0973325, SPN. 0410211, STZ. 0028568.

3,853,778.—TONER COMPOSITION EMPLOYING POLYMER WITH SIDE CHAIN CRYSTALLINITY. DEC. 10, 1974. AUS. 0465653, BEL. 0793639, CAN. 0998869, FRA. 7246888, GRB. 1423291, ITL. 0973330, SPN. 0410267, SWD. 7300003.

3,893,932.—PRESSURE FIXABLE TONER. JULY 8, 1975.

3,893,934.—SOLID DEVELOPER FOR ELECTROSTATIC LATENT IMAGES. JULY 8, 1975.

4,002,776.—IMAGING PROCESS EMPLOYING TONER PARTICLES CONTAINING ARYLSULPONAMIDE FORMALDEHYDE ADDUCT. JAN. 11, 1977.

4,027,048.—ELECTROSTRATOGRAPHIC DEVELOPMENT. ARG. 0196318, AUS. 0467046, BEL. 0792115, CAN. 1001884, FRA. 7239134, ITL. 0973326, MEX. 0128788, SPN. 0410205, STZ. 0028567, VZL. 0033139.

Class 5N 5A

3,729,419.—LIQUID DEVELOPER. APR. 24, 1973.

3,804,619.—COLOR ELECTROPHOTOGRAPHIC IMAGING PROCESS. APR. 16, 1974. CAN. 1005678, FRA. 7345057, GRB. 1435218.

3,836,244.—COLOR XEROGRAPHY. SEPT. 17, 1974.

3,841,893.—CHARGE CONTROL AGENTS FOR LIQUID DEVELOPERS. OCT. 15, 1974.

3,897,249.—TONERS FOR PHTHALOCYANINE PHOTORECEPTORS. JULY 29, 1975.

3,900,800.—HIGH VOLTAGE AMPLIFIER. AUG. 19, 1975.

3,909,259.—COLOR ELECTROPHOTOGRAPHIC IMAGING PROCESS UTILIZING SPECIFIC CARRIER-TONER COMBINATIONS. SEPT. 30, 1975. CAN. 1005678, FRA. 7345057, GRB. 1435218.
4,035,310.—YELLOW DEVELOPER. JULY 12, 1977.

Class 5N 5B

3,080,250.—SELF-TACKIFYING XEROGRAPHIC TONER. MAR. 5, 1963.
3,080,318.—THREE-COMPONENT XEROGRAPHIC TONER. MAR. 5, 1963.

Class 5N 6

3,755,177.—PROCESS OF MAKING LIQUID ELECTROSTATIC DEVELOPERS CONTAINING GELATIN. AUG. 28, 1973.
3,908,046.—P-XYLYENE VAPOR PHASE POLYMERIZATION COATING OF ELECTROSTATOGRAPHIC PARTICLES. SEPT. 23, 1975.
3,986,968.—MILLED AND POLAR SOLVENT EXTRACTED LIQUID DEVELOPER. OCT. 19, 1976.

Class 5N 6A

3,507,686.—METHOD OF COATING CARRIER BEADS. APR. 21, 1970. CAN. 0872190, GRB. 1239621, JAP. 0675782.
3,658,500.—METHOD OF PRODUCING GLASS BEADS FOR ELECTROSTATOGRAPHIC DEVELOPERS. APR. 25, 1972. CAN. 0916536, GRB. 1331485.
3,685,113.—DEVELOPER SYSTEM. AUG. 22, 1972. ARG. 0183679, BEL. 0764635, CAN. 0941211, FRA. 7110751, GRB. 1347568, ITL. 0922132, MEX. 0122432.
3,764,310.—METHOD OF PRODUCING ELECTROSTATOGRAPHIC DEVELOPER. OCT. 9, 1973.
3,789,796.—APPARATUS FOR PRODUCING DEVELOPER MATERIALS. FEB. 5, 1974.
3,989,435.—APPARATUS FOR FABRICATING SPHERICALLY SHAPED PARTICLES OF SMALL DIAMETER. NOV. 2, 1976.
4,019,842.—APPARATUS FOR FORMING MAGNETITE ELECTROSTATOGRAPHIC CARRIERS. APR. 26, 1977.

Class 5N 6B

2,862,889.—DEAGGLOMERATOR. DEC. 2, 1958.
3,326,848.—SPRAY DRIED LATEX TONERS. JUNE 20, 1967. AUS. 0409084, BEL. 0666056, CAN. 0866260, FRA. 1451366, GRB. 1115653, ITL. 0717377, MEX. 0088140, SWD. 0340046.
3,338,991.—METHOD OF FORMING ELECTROSTATIC TONER PARTICLES. AUG. 29, 1967. FRA. 1450642, GRB. 1115634, HOL. 0142251, ITL. 0717378, JAP. 0539572.
3,502,582.—IMAGING SYSTEMS. MAR. 24, 1970. ARG. 0171952, BEL. 0726571, CAN. 0873934, FRA. 1569382, GRB. 1237095, ITL. 0835554, MEX. 0100704, VZL. 0032414.
3,740,334.—PROCESS OF PREPARING SOLID DEVELOPERS FOR ELECTROSTATIC LATENT IMAGES. JUNE 19, 1973.
3,830,750.—ENCPSLING SBSTNLY SLUBL PRTN OF CORE MATL IN SBSTNLY SLBLE SHELL MATL OF DFRNT SOLUBLTY. AUG. 20, 1974. AUS. 0466018, BEL. 0793246, CAN. 0983328, GRB. 1411954, ITL. 0973317, SPN. 0410224, STZ. 0028527.
3,893,933.—PROCESS FOR PRODUCING ENCAPSULATED TONER COMPOSITION. JULY 8, 1975.
3,968,044.—MILLED LIQUID DEVELOPER. JULY 6, 1976.
3,990,797.—DIFFRACTION MONITORING OF RAYLEIGH MODE JETS. NOV. 9, 1976.
4,016,099.—METHOD OF FORMING ENCAPSULATED TONER PARTICLES. APR. 5, 1977.

Class 5O

3,641,981.—APPARATUS FOR CONTROLLING DEVELOPER CHARGE LEVEL. FEB. 15, 1972. CAN. 0914006, GRB. 1338417.
3,654,901.—TONER RECLAIMING SYSTEM. APR. 11, 1972. ATR. 0321720, AUS. 0459286, BEL. 0754425, CAN. 0941881, DNK. 0130262, EGR. 0085711, FRA. 7029147, GRB. 1325455, IND. 0127847, ITL. 0901160, JAP. 1143014, NOR. 0130609, PLD. 0080951, PLP. 0008671, PTG. 0054272, SAF. 0705408, SPN. 0382437, STZ. 0513441, SWD. 0361533, TIW. 0006725, USR. 0373974.
3,664,297.—CENTRIFUGAL DEVELOPMENT APPARATUS AND METHOD. MAY 23, 1972. GRB. 1315565, JAP. 0719144.
3,809,012.—DEVELOPER SEAL. MAY 7, 1974. CAN. 0984133.
3,872,826.—DEVELOPMENT SYSTEM SEAL. MAR. 25, 1975.
3,893,415.—DEVELOPING APPARATUS. JULY 8, 1975. ARG. 0204387, BEL. 0789238, BRA. 0088405, CAN. 0991394, FRA. 7232380, GRB. 1409815, ITL. 0970948, MEX. 0128578, SPN. 0408654, STZ. 0554551, SWD. 7214863, VZL. 0033578.
3,906,899.—DEVELOPER SEAL. SEPT. 23, 1975.
3,915,121.—DEVELOPMENT APPARATUS. OCT. 28, 1975.
3,924,566.—REPRODUCTION MACHINE WITH MEANS FOR SOLIDIFYING THE RECLAIM TONER. DEC. 9, 1975.
3,982,498.—DEVELOPMENT APPARATUS. SEPT. 28, 1976. FRA. 7436713.
4,029,047.—IMPROVED TONER HANDLING SYSTEM. JUNE 14, 1977.

Class 5P

3,649,262.—SIMULTANEOUS DEVELOPMENT-CLEANING OF SAME AREA OF AN ELECTROSTATOGRAPHIC IMAGE SUPPORT SURFACE. MAR. 14, 1972. AUS. 0445365, BEL. 0743661, CAN. 0916232, FRA. 6944511, GRB. 1296997, ITL. 0882670, USR. 0358873.
4,029,047.—IMPROVED TONER HANDLING SYSTEM. JUNE 14, 1977.

Class 6

3,753,560.—AUXILIARY SHEET FEEDER-MULTI STATION AUXILIARY PAPER FEEDER-2400. AUG. 21, 1973. AUS. 0466179, BEL. 0793641, CAN. 1000750, FRA. 7300150, GRB. 1402971, ITL. 0973328, SPN. 0410322.
3,833,790.—HEATED PRESSURE FUSING SYSTEM. SEPT. 3, 1974, FRA. 7422884.

Class 6A

3,104,873.—PAPER SUPPLY TRAY. SEPT. 24, 1963. CAN. 0699129, GRB. 1016553.
3,153,534.—PAPER SUPPLY TRAY. OCT. 20, 1964.
3,154,356.—PAPER CATCH TRAY. OCT. 27, 1964. CAN. 0726574, GRB. 1032952, JAP. 0497185.
3,405,635.—PAPER SUPPORT TRAY FOR REPRODUCTION MACHINES. OCT. 15, 1968.
3,406,964.—ADJUSTABLE PACK HOLDER. OCT. 22, 1968. CAN. 0848822, GER. 1270049, GRB. 1158671, JAP. 0914623.
3,415,510.—AUXILIARY SHEET FEEDER. DEC. 10, 1968. CAN. 0831412, GRB. 1235158.
3,458,187.—SHEET HOLDER. JULY 29, 1969. CAN. 0879560, GRB. 1199947.
3,599,966.—SHEET HANDLING APPARATUS. AUG. 17, 1971. CAN. 0921504, JAP. 783765.
3,601,394.—SHEET RETAINING APPARATUS. AUG. 24, 1971. ARG. 0195162, AUS. 0437722, BEL. 0752940, CAN. 0966521, CHL. 0026165, CZC. 0164276, EGR. 0085710, FRA. 7024668, GRB. 1312304, ITL. 0900198, JAP. 0803409, MEX. 0116509, PLD. 0082760, PNM. 0002170, SPN. 0381385, STZ. 0547747, SWD. 0361648, TIW. 0005745, USR. 0493985.
3,651,933.—COPY SHEET PACKAGE. MAR. 28, 1972.
3,687,448.—SHEET FEEDING APPARATUS. AUG. 29, 1972. CAN. 9782161, GRB. 1373810.
3,847,385.—SHEET CONTAINER. NOV. 12, 1974. CAN. 0991208.
3,847,388.—SHEET STACKING METHOD AND APPARATUS. NOV. 12, 1974. CAN. 0996145, FRA. 7344220, GRB. 1440489, MEX. 0134934.
3,848,988.—MOISTURE CONTROL DEVICE. NOV. 19, 1974.
3,857,558.—PAPER CASSETTE DESIGN WITH IRREGULAR BOTTOM. DEC. 31, 1974, CAN. 1010083.
3,883,133.—MOVABLE PACK ADVANCER. MAY 13, 1975.
3,907,283.—SENSING SHEETS ON A SUPPORT SURFACE. SEPT. 23, 1975.
3,921,972.—SHEET STACK RECEPTACLE. NOV. 25, 1975.
3,926,519.—CONTROL DEVICE FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. DEC. 16, 1975.
3,934,870.—SHEET FEEDING DEVICES. JAN. 27, 1976.
3,936,044.—ADJUSTABLE SHEET GUIDE. FEB. 3, 1976.
3,957,366.—SHEET FEEDING APPARATUS. MAY 18, 1976.
3,995,951.—SHEET FEEDING APPARATUS & REPRODUCING MACHINE. DEC. 7, 1976.
4,008,957.—REPRODUCTION MACHINE CONTROL. FEB. 22, 1977.
4,014,537.—AIR FLOATATION BOTTOM FEEDER. MAR. 29, 1977.

Class 6A 1

3,100,111.—SHEET FEED MECHANISM. AUG. 6, 1963. ARG. 0162642, CAN. 0683564, GRB. 1032956, IND. 0096309, JAP. 0478677.
3,301,551.—SHEET FEED MECHANISM. JAN. 31, 1967. CAN. 0811029, JAP. 0639312.
3,378,254.—PACK ADVANCER. APR. 16, 1968. CAN. 0815409, GER. 1289850, GRB. 1129872, JAP. 0615872.
3,402,928.—SHEET HANDLING APPARATUS. SEPT. 24, 1968. CAN. 0871575, GRB. 1203615, JAP. 0602168.
3,558,127.—SHEET HANDLING APPARATUS. JAN. 26, 1971. ARG. 0180315, AUS. 0443480, BEL. 0741889, CAN. 0928826, FRA. 6939710, GRB. 1282910, ITL. 0878226, JAP. 0791733, MEX. 0112773, SPN. 0373541, SWD. 6915742.
3,630,517.—COUNTER STACKER. DEC. 28, 1971.
3,768,806.—BI-DIRECTIONALLY MOVABLE PLATFORM CONTROL. OCT. 30, 1973. CAN. 0992113, GRB. 1403040.
3,820,777.—ELEVATOR ASSEMBLY POSITIONING CONTROL. JUNE 28, 1974. BEL. 0802196, CAN. 0999334, GRB. 1416470.
3,898,425.—FUSING APPARATUS. AUG. 5, 1975.
4,004,127.—IMPROVED ON LINE FUSING SYSTEM. JAN. 18, 1977.
4,033,578.—STACK ELEVATING APPARATUS. MAY 7, 1977.

Class 6B

3,847,388.—SHEET STACKING METHOD AND APPARATUS. NOV. 12, 1974. CAN. 0996145, FRA. 7344220, GRB. 1440489, MEX. 0134934.
3,958,989.—TRANSPARENCY SUPPORT MATERIAL FOR ELECTROPHOTOGRAPHIC PROCESS. MAY 25, 1976. BEL. 0815634, CAN. 1006012.

Class 6B 1

2,945,434.—SHEET FEED MECHANISM. JULY 19, 1960. CAN. 0693829.
3,062,533.—PAPER FEED APPARATUS. NOV. 6, 1962. CAN. 0712936.
3,062,534.—SHEET FEED MECHANISM. NOV. 6, 1962. GRB. 1016700.
3,083,962.—SHEET STRIPPER. APR. 2, 1963. ARG. 0165468, CAN. 0712935, GRB. 1032958, IND. 0096311, JAP. 0484728.
3,104,872.—EDGE DRAG DEVICE. SEPT. 24, 1963. CAN. 0699594.
3,241,830.—SHEET FEED MECHANISM. MAR. 22, 1966. ATR. 0276087, AUS. 0295720, CAN. 0765301, DNK. 0126493, EIR. 0028650, GER. 1197326, GRB. 1089538, ISR. 0030228, NZL. 0148732, STZ. 0457511.
3,251,594.—SHEET FEED MECHANISM. MAY 17, 1966. AUS. 0416589, CAN. 0785164, DNK. 131.557, EIR. 0029758, GRB. 1122623, ISR. 0034134, JAP. 0499006, NOR. 0125806, SWD. 0358480.
3,276,770.—SHEET FEEDING APPARATUS. OCT. 4, 1966. CAN. 0788346, FRA. 1459041, GER. 1237587, GRB. 1055215, ITL. 0726800, JAP. 0537118.
3,288,460.—PAPER FEED MECHANISM. NOV. 29, 1966. ATR. 0300566, CAN. 0792617, GRB. 1135746, JAP. 0630911, STZ. 0509924.
3,288,461.—SHEET FEEDING APPARATUS. NOV. 29, 1966. CAN. 0856098, GER. 1249887, GRB. 1123260, JAP. 0562385.
3,300,206.—ELECTRICALLY ENERGIZED CLUTCH FOR SHEET FEED CONTROL MECHANISM. JAN. 24, 1967. CAN. 0788344, GRB. 1135745, MEX. 0112221, STZ. 0513063.
3,406,960.—PAPER HANDLING APPARATUS. OCT. 22, 1968. CAN. 0907683, GRB. 1202218.
3,425,685.—PAPER FEED MECHANISM. FEB. 4, 1969. BEL. 0708498, CAN. 0847744, FRA. 1552327, GRB. 1165279, ITL. 0819625, JAP. 0972609, MEX. 0105134.
3,469,834.—SHEET FEEDER AND SEPARATOR APPARATUS. SEPT. 30, 1969. ARG. 0168907, CAN. 0847743, CHL. 0023614, CLB. 0017683, JAM. 0001852, MEX. 0102646, PRU. 0009339, URG. 0008981, VZL. 0023673.
3,524,639.—AUTOMATIC FEEDING DEVICE. AUG. 18, 1970. CAN. 0895184, FRA. 6906418, GRB. 1254784, ITL. 0875431, JAP. 0713806.
3,537,703.—MANIFOLD SHEET SEPARATING DEVICE. NOV. 3, 1970. CAN. 0923351, GRB. 1261077.
3,556,516.—SELF-ALIGNING FEED ROLLER. JAN. 19, 1971. CAN. 0899392, GRB. 1256265.
3,565,421.—FEEDING SYSTEM. FEB. 23, 1971.
3,567,214.—SHEET FEEDING AND SEPARATING APPARATUS. MAR. 2, 1971. BEL. 0734128, CAN. 0902124, FRA. 6919122, GER. 1929105, GRB. 1263193, HOL. 0144551, ITL. 0866188, SPN. 0368173, STZ. 0501501, SWD. 6908176.
3,578,317.—SHEET CONVEYOR APPARATUS FOR AUTOMATIC COPYING MACHINE. MAY 11, 1971. ARG. 0193800, ATR. 0307233, AUS. 0446229, BEL. 0750390, CAN. 0907682, EGR. 0082423, FRA. 7017317, GRB. 1284832, ITL. 0893096, JAP. 783766, MEX. 0117916, NZL. 0160102, SPN. 0379652, STZ. 0516404, SWD. 0361952, TIW. 0006833, VZL. 0025781.
3,580,565.—SHEET FEEDING APPARATUS. MAY 25, 1971.
3,592,462.—GATED PAPER SNUBBER. JULY 13, 1971. CAN. 0923922.
3,601,389.—SHEET FEEDING APPARATUS. AUG. 24, 1971. ARG. 0184657, BEL. 0752939, CAN. 0912055, CHL. 0026164, FRA. 7024666, GRB. 1306595, GUA. 0002508, ITL. 0907152, MEX. 0114977, PNM. 0002212, TIW. 0006720, VZL. 0032784.
3,618,752.—STACK OF IMAGE RECEIVING MEMBERS. NOV. 9, 1971.
3,655,183.—SHEET FEED APPARATUS. APR. 11, 1972.
3,664,663.—PAPER CASSETTE LOADING DEVICE. MAY 23, 1972. CAN. 0951342, GRB. 1351766.
3,713,645.—SHEET SEPARATING APPARATUS. JAN. 30, 1973. CAN. 0957392.
3,727,910.—SHEET SEPARATOR APPARATUS. APR. 17, 1973. CAN. 0956660, GRB. 1391198.
3,731,915.—FEED ROLL ABRASION ROLLER. MAY 8, 1973. ARG. 0194272, BEL. 0791064, CAN. 0966518, FRA. 7239549, GRB. 1389426, ITL. 0970223.
3,768,803.—SHEET FEEDER. OCT. 30, 1973. ARG. 0197314, BEL. 0795206, CAN. 0966158, FRA. 7304740, GRB. 1413541, ITL. 0978938, MEX. 0130347, SPN. 0411475, STZ. 5656860, SWD. 7301809, VZL. 0033780.
3,773,316.—SHEET FEEDER DRIVE MECHANISM. NOV. 20, 1973. CAN. 0994376, GRB. 1424580.
3,861,670.—SHEET FEEDING APPARATUS. JAN. 21, 1975. CAN. 1010080, GRB. 1435762.
3,866,901.—REVERSE BUCKLE FEEDER. FEB. 18, 1975, CAN. 1008893.
3,873,084.—PAPER FEEDER. MAR. 25, 1975.
3,893,663.—REVERSE BUCKLE SHEET FEEDING APPARATUS. JULY 8, 1975, CAN. 1005090, GRB. 1447909, MEX. 0135280.
3,895,791.—BOTTOM SHEET FEEDER USING SEPARATION BELT AND RETARD PAD. JULY 22, 1975, CAN. 1007255, GRB. 1443089.
3,934,869.—SHEET SEPARATING AND FEEDING APPARATUS. JAN. 27, 1976. GER. 7439833.
3,936,046.—FRONT AND SIDE SHEET REGISTERING APPARATUS. FEB. 3, 1976.
3,941,373.—FLOATING GATE SHEET SEPARATOR. MAR. 2, 1976.
3,947,018.—UNIVERSAL FEEDER-STACKER. MAR. 30, 1976. BEL. 0836262.
3,949,979.—SINGLE LONGITUDINAL MODE GAAS/GAALAS DOUBLE HETEROSTRUCTURE LASER. APR. 13, 1976.
3,966,189.—TOGGLING RETARD PAD. JUNE 29, 1976.
3,995,952.—SHEET FEEDING APPARATUS. DEC. 7, 1976.
4,023,792.—SHEET FEEDING APPARATUS. MAY 17, 1977. ARG. 0195877, AUS. 0462397, BEL. 0792370, CAN. 0978556, FRA. 7239132, GRB. 1410799, ITL. 0990513, MEX. 0128127, SPN. 0437744, STZ. 0546689.
4,030,725.—PAPER TRAY FOR COPYING MACHINES. JUNE 21, 1977.

Class 6B 2

3,378,255.—PAPER HANDLING APPARATUS. APR. 16, 1968. CAN. 0836939, FRA. 1527333, GRB. 1181271, ITL. 0804517, JAP. 1052342, MEX. 0099951.
3,547,431.—PNEUMATIC CUT SHEET FEEDER. DEC. 15, 1970.

Class 6C

3,120,446.—METHOD OF TRANSFERRING A DEVELOPED SOLID PARTICULATE IMAGE. FEB. 4, 1964.
3,519,124.—ARTICLE TO FACILITATE FEEDING OF IMAGE RECEIVING SHEETS. JULY 7, 1970. CAN. 0941879, FRA. 1568821, GRB. 1216347, ITL. 0870563.
3,589,809.—FEEDING SYSTEM. JUNE 29, 1971.
3,630,514.—SHEET FEEDING APPARATUS. DEC. 28, 1971. ARG. 0186214, AUS. 0452075, BEL. 0751309, CAN. 0921948, EGR. 0090063, FRA. 7019460, GRB. 1253503, ITL. 0893690, JAP. 783764, MEX. 0117507, SPN. 0380270, STZ. 0511759, SWD. 0363621, TIW. 0006836, USR. 0466680.

3,645,615.—COPYING APPARATUS. FEB. 29, 1972. ARG. 0185529, AUS. 0445849, BEL. 0752941, CAN. 0925927, CHL. 0025888, FRA. 7024670, GRB. 1312305, GUA. 0002324, ITL. 0900200, MEX. 0115165, PNM. 0002260, SPN. 0381387, STZ. 0525778, SWD. 7009063, TIW. 0007163, USR. 0535033, VZL. 0032783.

3,902,421.—METHOD FOR FORMING A PICTURE IMAGE. SEPT. 2, 1975.

Class 6D

2,065,383.—PHOTOCOPY MACHINE. DEC. 22, 1936.

2,265,975.—PHOTO-COPY MACHINE. DEC. 9, 1941.

2,684,902.—IMAGE TRANSFER MECHANISM FOR ELECTROSTATICALLY ADHERING IMAGES. JULY 27, 1954. CAN. 0532395.

2,781,705.—PAPER HANDLING MECHANISM FOR XEROGRAPHIC COPYING MACHINE. FEB. 19, 1957. CAN. 0547484.

2,871,819.—XEROGRAPHIC REGISTRATION GUIDE. FEB. 3, 1959.

3,062,538.—SHEET FEEDING APPARATUS. NOV. 6, 1962. CAN. 0701742.

3,071,370.—SHEET FEEDING APPARATUS. JAN. 1, 1963. CAN. 0683900, GRB. 0999435.

3,071,374.—PAPER GRIPPER MECHANISM. JAN. 1, 1963.

3,078,770.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 26, 1963. CAN. 0701741.

3,095,194.—SHEET GUIDING APPARATUS. JUNE 25, 1963. CAN. 0713451, FRA. 1355072, GER. 1174334, GRB. 1026214, ITL. 0688494, JAP. 0457839.

3,100,109.—PAPER GRIPPER MECHANISM. AUG. 6, 1963. GRB. 1015634, JAP. 0471314.

3,100,112.—DOCUMENT FEED MECHANISM. AUG. 6, 1963. GRB. 1015635, JAP. 0478676.

3,137,495.—SHEET FEED MECHANISM. JUNE 16, 1964. GRB. 1015636, JAP. 0471315.

3,179,407.—SHEET FEED GUIDE. APR. 20, 1965. CAN. 0719606, FRA. 1355071, GER. 1179562, GRB. 1023036, ITL. 0688495, JAP. 0457850.

3,190,643.—SHEET GUIDING APPARATUS. JUNE 22, 1965.

3,199,866.—SHEET FEED MECHANISM. AUG. 10, 1965. CAN. 0742591, GRB. 1043646.

3,206,193.—XEROGRAPHIC REPRODUCING MACHINE CONTROL. SEPT. 14, 1965.

3,239,215.—DOCUMENT FEED MECHANISM. MAR. 8, 1966. CAN. 0741548, GRB. 1052820, JAP. 0497188.

3,239,220.—DOCUMENT CONVEYOR. MAR. 8, 1966. CAN. 0770495, FRA. 1434188, GRB. 1094188, ITL. 0742434.

3,245,311.—DOCUMENT CONVEYOR. APR. 12, 1966.

3,256,009.—SHEET REGISTRATION DEVICE. JUNE 14, 1966. CAN. 0777667.

3,281,144.—SHEET REGISTRATION DEVICE. OCT. 25, 1966. ARG. 0152212, AUS. 0423243, CAN. 0803888, DNK. 0122597, EIR. 0029757, GRB. 1122621, ISR. 0034133, JAP. 0512650, MEX. 0078899, NOR. 0126565, SWD. 0358034.

3,357,347.—PAPER FEEDING AND BREAKING MEANS FOR ELECTROGRAPHIC DEVICE. DEC. 12, 1967. CAN. 0863520, GRB. 1182684, JAP. 0582500.

3,374,732.—SELF-ALIGNING COPY DRUM STRIPOUT MECHANISM FOR REPRODUCTION MACH. MAR. 26, 1968.

3,375,781.—REGISTRATION MECHANISM FOR A REPRODUCTION MACHINE. APR. 2, 1968.

3,389,907.—DOCUMENT HANDLING APPARATUS. JUNE 25, 1968.

3,411,771.—SHEET TRANSPORT. NOV. 19, 1968. ARG. 0177552, ATR. 0284168, AUS. 0455833, CAN. 0869421, CHL. 0023101, CLB. 0016775, DNK. 0126100, EIR. 0031308, FIN. 0047867, GRB. 1193515, IND. 0112002, ISR. 0028520, JAP. 0604153, MEX. 0099909, NOR. 0127531, NZL. 0149790, PAK. 0119259, PLP. 0005199, PRU. 0009331, SAF. 0674988, SPN. 0344351, STZ. 0478048, SWD. 0343829, TRK. 0015345, URG. 0008858, VZL. 0026277.

3,422,756.—PAPER SUPPORT AND REGISTRATION MEANS FOR REPRODUCTION MACHINE. JAN. 21, 1969.

3,434,710.—SHEET HANDLING APPARATUS. MAR. 25, 1969. ARG. 0166613, CAN. 0830328, CHL. 0023568, CLB. 0017530, DNK. 0120163, GRB. 1206965, MEX. 0100814, PRU. 0009338, SPN. 0360895, STZ. 0502942. URG. 0008977, USR. 0433696, VZL. 0023674.

3,502,325.—CARD HANDLING APPARATUS. MAR. 24, 1970. ARG. 0168398, CAN. 0850515, CHL. 0024133, JAM. 0001890, MEX. 0105082, PRU. 0009337, URG. 0009016, VZL. 0027509.

3,509,780.—DOUBLE-ACTION ROTARY SOLENOID DRIVE MECHANISM. MAY 5, 1970.

3,517,923.—SHEET REGISTRATION APPARATUS. JUNE 30, 1970.

3,518,739.—TRACKING ROLLER. JULY 7, 1970. ARG. 0177437, AUS. 0437287, BEL. 0733662, BRA. 6908481, CAN. 0884215, FRA. 6917189, GRB. 1206750, ITL. 0865847, JAP. 0677424, MEX. 0111433, SPN. 0367807, SWD. 0356022, VZL. 0025065.

3,521,060.—METHOD FOR DETECTING MISROUTING OF TRANSPARENCIES DURING PROCESS OF IMAGING THEREON. JULY 21, 1970.

3,531,109.—SHEET MATERIAL TRANSPORT SYSTEM. SEPT. 29, 1970. ARG. 0177190, ATR. 0288161, AUS. 0446394, BEL. 0733197, CAN. 0899923, DNK. 0122717, FRA. 6916409, GER. 1925039, GRB. 1269100, ITL. 0863848, JAP. 0656986, MEX. 0110288, PNM. 0001431, SAF. 0693497, SPN. 0367408, SWD. 0355870.

3,536,320.—SHEET REGISTRATION DEVICE. OCT. 27, 1970.

3,556,511.—DOCUMENT FEED APPARATUS. JAN. 19, 1971. ARG. 0185791, BEL. 0741891, CAN. 0905439, FRA. 6939711, GER. 1957780, GRB. 1279129, HOL. 0144227, ITL. 0878272, JAP. 0854601, MEX. 0112825.

3,556,512.—DOCUMENT FEED APPARATUS. JAN. 19, 1971. CAN. 0905438, SWD. 6915838.

3,556,513.—DOCUMENT FEED APPARATUS. JAN. 19, 1971. CAN. 0905437.

3,601,392.—SHEET REGISTERING APPARATUS. AUG. 24, 1971. ARG. 0190238, AUS. 0446147, BEL. 0752933, CAN. 0923512, CHL. 0025789, EGR. 0084327, FRA. 7024672, GRB. 1262444, ITL. 0900199, JAP. 0803410, MEX. 0115310, PLD. 0002183, PNM. 0002050, SPN. 0381386, STZ. 0525780, SWD. 0356375, TIW. 0007194, USR. 0406343.

3,603,680.—ULTRASONIC PAPER DETACTION. SEPT. 7, 1971. CAN. 0915715, GRB. 1331457.

3,614,221.—IMAGING SYSTEM. OCT. 19, 1971. CAN. 0930540, GRB. 1343603, JAP. 0728865.

3,622,238.—COPIER MACHINE FEEDING MULTIPLE SIZE COPY SHEETS. NOV. 23, 1971. ARG. 0194337, AUS. 0451241, CAN. 0902127, JAP. 0512383, NZL. 0160105.

3,647,207.—SHEET FEEDING MECHANISM CENTERING DEVICE. MAR. 7, 1972. CAN. 0959934, GRB. 1351765.

3,694,712.—SPEED CONTROL APPARATUS. SEPT. 26, 1972. CAN. 0976641, GRB. 1339506.

3,796,486.—PROGRAMMING CONTROL SYSTEM FOR PRINTING MACHINE. MAR. 12, 1974.

3,804,516.—FIRE DETECTING DEVICE FOR A PHOTOGRAPHIC PRINTING MACHINE. APR. 16, 1974.

3,809,475.—COPIER FUSER PROTECTOR. MAY 7, 1974. FRA. 7343567.

3,815,380.—SHAFT COUPLING APPARATUS. JUNE 11, 1974, CAN. 0994121.

3,819,266.—COPIER JAM PROTECTION. JUNE 25, 1974, CAN. 1005510.

3,845,951.—FORAMINOUS SHEET REGISTRATION SYSTEM. NOV. 5, 1974, CAN. 0999316.

3,858,777.—PRINTING APPARATUS INCLUDING REGISTRATION CONTROL. JAN. 7, 1975.

3,861,673.—BI-DIRECTIONAL SHEET TRANSPORT. JAN. 21, 1975, CAN. 1004240.

3,876,317.—LATCH MECHANISM. APR. 8, 1975, CAN. 1005486.

3,888,579.—DIGITAL CONTROLLED DOCUMENT FEEDER. JUNE 10, 1975.

3,893,662.—SHEET FEEDING DEVICE. JULY 8, 1975.

3,902,421.—METHOD FOR FORMING A PICTURE IMAGE. SEPT. 2, 1975.

3,934,182.—SYNCHRONIZING APPARATUS. JAN. 20, 1976. CAN. 0957735, GRB. 1372568.

3,936,042.—SHEET FEEDING DEVICES. FEB. 3, 1976.

3,947,270.—REPRODUCING APPARATUS AND PROCESS FOR DUPLEX IMAGING IN A SINGLE PASS. MAR. 30, 1976.

3,948,511.—SHEET FEEDING DEVICES. APR. 6, 1976.

3,949,979.—SINGLE LONGITUDINAL MODE GAAS/GAALAS DOUBLE HETEROSTRUCTURE LASER. APR. 13, 1976

3,963,339.—SHEET FEEDING APPARATUS. JUNE 15, 1976.

3,984,098.—PNEUMATIC REGISTRATION AND CLAMPING APPARATUS. OCT. 5, 1976. BEL. 0848824.

4,003,568.—FLUID CONVEYER. JAN. 18, 1977.

4,025,187.—BUCKLE CONTROL SYSTEM. MAY 24, 1977.

4,036,421.—WEIGHTED PINCH ROLLS. JULY 19, 1977.

Class 6D 1

RE.29,124.—SHEET TRANSPORT SYSTEM. JAN. 25, 1977. CAN. 1001104.

2,444,170.—PHOTOGRAPHIC PRINT CONVEYING MECHANISM. JUNE 29, 1948.

2,446,246.—PHOTOCOPY MACHINE. AUG. 3, 1948.

2,547,979.—PHOTOCOPY MACHINE. APR. 10, 1951.
3,148,878.—SHEET FEED MECHANISM. SEPT. 15, 1964. CAN. 0715431, GER. 1222083, GRB. 1020933, JAP. 0481251.
3,240,486.—PAPER TRANSPORT MECHANISM. MAR. 15, 1966. CAN. 0766647.
3,275,318.—SHEET CONVEYING APPARATUS. SEPT. 27, 1966. MEX. 0085657.
3,408,633.—HIGH SPEED PRINTER SYSTEM. OCT. 29, 1968.
3,482,676.—DOCUMENT FEED BELT. DEC. 9, 1969. CAN. 0890297, GRB. 1253415.
3,642,362.—APPARATUS FOR CONVEYING SHEET MATERIAL. FEB. 15, 1972. GRB. 1307117.
3,719,951.—WRAP ADJUST DEVICE FOR CONTROLLING ENGAGEMENT BETWEEN A WEB AND ROLLER IN AN IMAGING SYSTEM. MAR. 6, 1973. CAN. 0995295, GRB. 1406047.
3,743,403.—TRANSPORT ASSEMBLY. JULY 3, 1973. CAN. 0983305, GRB. 1417018.
3,781,004.—CONVEYING SYSTEM FOR ELECTROSTATIC PRINTING MACHINES. DEC. 25, 1973. CAN. 1007287.
3,790,270.—REGISTRATION RESET SYSTEM. FEB. 5, 1974. GRB. 1439772, ITL. 0993064, SPN. 0418253.
3,804,507.—PROCESSING CONTROL DEVICE FOR PRINTING MACHINES. APR. 16, 1974.
3,808,658.—SNAP ROLLER. MAY 7, 1974, CAN. 1000637.
3,826,568.—SHEET TRANSPORT SYSTEM. JULY 30, 1974, CAN. 1001104.
3,832,053.—BELT TRANSFER SYSTEM. AUG. 27, 1974.
3,846,020.—ELECTROSTATIC SHEET TRANSPORT SYSTEM. NOV. 5, 1974.
3,854,566.—PHOTOELECTRIC TABULATING APPARATUS. DEC. 17, 1974. BEL. 0815420, CAN. 0982969, GRB. 1442450, ITL. 1012805, SWD. 7406400.
3,902,715.—SHEET REGISTRATION FOR PAPER HANDLING APPARATUS. SEPT. 2, 1975, CAN. 1003867, ITL. 0993066, SPN. 0418255.
3,918,705.—PROCESSING CONTROL DEVICE FOR PRINTING MACHINES. NOV. 11, 1975.
3,930,725.—MULTIPLE SHEET FEEDING SYSTEM FOR ELECTROSTATOGRAPHIC PRINTING MACHINES. JAN. 6, 1976. GRB. 1436457.

Class 6D 2

3,112,819.—CLUTCH MECHANISM—914. DEC. 3, 1963. CAN. 0688810.
3,337,015.—LATCH OPERATED AND ONE WAY COIL CLUTCHES. AUG. 22, 1967. CAN. 0810494, JAP. 0914622.
3,840,100.—UNIDIRECTIONAL COUPLING APPARATUS. OCT. 8, 1974. CAN. 1006706.

Class 6E

RE29124.—SHEET TRANSPORT SYSTEM. JAN. 25, 1977. CAN. 1001104.
3,348,288.—DRUM CLAMP. OCT. 24, 1967. CAN. 0838542, GRB. 1123459.
3,357,325.—XEROGRAPHIC TRANSFER APPARATUS. DEC. 12, 1967. CAN. 0812525.
3,375,782.—PROGRAMMING MECHANISM FOR A REPRODUCTION MACHINE. APR. 2, 1968.
3,567,213.—CONTROL APPARATUS FOR REGISTER STOPS AND GRIPPER FINGERS. MAR. 2, 1971.
3,685,898.—PAPER FLIP CONTROL APPARATUS. AUG. 22, 1972.
3,717,801.—METHODS AND APPARATUS FOR ELCLRSTCLY PRFMNG A TCKING OPERATION. FEB. 20, 1973.
3,826,568.—SHEET TRANSPORT SYSTEM. JULY 30, 1974. CAN. 1001104.
3,841,751.—ELECTROSTATIC COLOR REPRODUCTION METHOD. OCT. 15, 1974. CAN. 0946463.
3,845,951.—FORAMINOUS SHEET REGISTRATION SYSTEM. NOV. 5, 1974. CAN. 0999316.
3,976,370.—BELT TRANSFER AND FUSING SYSTEM. AUG. 24, 1976.
3,993,124.—METH&APPRTS FOR SUSR ASSMBLY CLING IN ELCTROSTATOGRPC MACHNE-GAMMA METH&APPRTS FOR FUSER END CO. NOV. 23, 1976. BEL. 0793560, FRA. 7246728, ITL. 0973322, SWD. 7216976.
3,995,951.—SHEET FEEDING APPARATUS & REPRODUCING MACHINE. DEC. 7, 1976.

Class 6F

3,249,354.—MULTIPLE SHEET DETECTING DEVICE. MAY 3, 1966. CAN. 0770494.
3,281,145.—PAPER REJECT MECHANISM. OCT. 25, 1966. CAN. 0770493.
3,288,462.—APPARATUS FOR HANDLING SUPERPOSED SHEETS. NOV. 29, 1966. AUS. 0422882, CAN. 0786210, EIR. 0029759, GRB. 1122625, ISR. 0034135, JAP. 0894757, NOR. 0124531.
3,301,975.—SENSING DEVICE FOR DETECTING A SHEET ON A TRANSPORT OR DRUM. JAN. 31, 1967. CAN. 0800094, FRA. 1487581, GER. 1522699, GRB. 1077117, ITL. 0774188, JAP. 0923304.
3,360,652.—FAIL SAFE PHOTOELECTRIC SHEET SENSING MACHINE CONTROL CIRCUIT. DEC. 26, 1967. CAN. 0775268, FRA. 1455478, GER. 1522805, GRB. 1121099, ITL. 0732531, JAP. 0503244, MEX. 0078869.
3,396,965.—SENSOR GAUGE. AUG. 13, 1968. CAN. 0822218, GRB. 1152538, JAP. 0587326.
3,504,911.—VACUUM POWERED MULTIPLE DOCUMENT DETECTOR. APR. 7, 1970. CAN. 0861362, FRA. 1589986, GER. 1804476, GRB. 1241968, ITL. 0845395, JAP. 0656984.
3,593,065.—SHEET DETECTION APPARATUS. JULY 13, 1971. CAN. 0923544, CZC. 0151559, EGR. 0100567, GRB. 1322794, JAP. 1162030, USR. 0365085.
3,614,419.—MULTIPLE SHEET DETECTION SYSTEM. OCT. 19, 1971. ARG. 0186441, BEL. 0765366, CAN. 0930052, FRA. 7113404, GRB. 1342656, ITL. 0922694, MEX. 0119754, VZL. 0021933.
3,627,311.—SHEET SENSOR. DEC. 14, 1971. CAN. 0871371, GRB. 1322258.
3,628,785.—GRIP FORCE DETECTION APPARATUS. DEC. 21, 1971. ARG. 0185946, AUS. 0455882, BEL. 0760750, CAN. 0923158, FRA. 7047695, GRB. 1340206, ITL. 0913997, MEX. 0117505, STZ. 0518227, SWD. 7017384, VZL. 0032788.
3,650,616.—MISPUFF DETECTOR. MAR. 21, 1972. BEL. 0778739, CAN. 0954181, FRA. 7203548, GRB. 1374923, ITL. 0947120.
3,650,617.—SWITCHING DETECTOR—A. MAR. 21, 1972.
3,650,618.—SWITCHING DETECTOR—B. MAR. 21, 1972.
3,650,619.—SWITCHING DETECTOR—C. MAR. 21, 1972.
3,684,890.—PHOTOSENSITIVE MISFEED DETECTOR. AUG. 15, 1972. CAN. 0929631, GRB. 1335444.
3,778,051.—SUPERPOSED SHEET DETECTOR. DEC. 11, 1973. CAN. 0975067.
3,791,729.—APPARATUS FOR MONITORING A SHEET TRANSPORT MECHANISM. FEB. 12, 1974. CAN. 0991244, GRB. 1413069.
3,882,308.—DETECTION SYSTEM FOR SUPERPOSED SHEETS. MAY 6, 1975. CAN. 0929632, GRB. 1342838.
3,932,755.—DEVICE FOR DETECTING DOUBLE SHEET FEEDING. JAN. 13, 1976.
3,948,508.—SHEET DETECTING APPARATUS. APR. 6, 1976.
4,025,187.—BUCKLE CONTROL SYSTEM. MAY 24, 1977.

Class 6G

3,152,757.—XEROGRAPHIC CONTROL APPARATUS. OCT. 13, 1964. JAP. 0494168.
3,260,455.—STEPPED COUNTING APPARATUS. JULY 12, 1966. ARG. 0157223, BRA. 0083779, CAN. 0760825, FRA. 1459930, GER. 1513422, GRB. 1113420, ITL. 0729650, MEX. 0094217.
3,301,126.—REPRODUCING APPARATUS. JAN. 31, 1967. CAN. 0777413, EIR. 0029760, GRB. 1122626, ISR. 0034136, JAP. 0669365, NOR. 0128732.
3,358,570.—COPY COUNTING SYSTEM. DEC. 19, 1967. CAN. 0842444, FRA. 1508192, GER. 1283855, GRB. 1165943, ITL. 0787991, JAP. 0572187.
3,375,780.—SHEET COUNTING MECHANISM FOR REPRODUCTION MACHINES. APR. 2, 1968.
3,375,783.—COPY INDICATING MECHANISM FOR A REPRODUCTION MACHINE. APR. 2, 1968.
3,588,472.—LOGIC CONTROL APPARATUS. JUNE 28, 1971. ARG. 0181590, ATR. 0279353, BEL. 0706629, BRA. 6793350, CAN. 0834957, FRA. 1567082, GRB. 1204719, ITL. 0815466, JAP. 0645591, LXB. 0054882, MEX. 0101675, VZL. 0023684.
3,655,281.—BILLING APPARATUS. APR. 11, 1972. BEL. 0760911, CAN. 0929013, FRA. 7047633, GRB. 1329579, ITL. 0913956, JAP. 0766713.
3,813,157.—CONTROL LOGIC FOR TROUBLE DETECTION AND RECOVERY. MAY 28, 1974. GRB. 1457781, ITL. 1009725, SPN. 0425049.
3,831,933.—TAMPER DETECTION AND RECOVERY. AUG. 27, 1974. GRB. 1457781, ITL. 1009725, SPN. 0425049.
3,909,128.—CONTROL LOGIC FOR CHARGING A MULTI-MODE COPIER DUPLICATOR FROM ONE MODE TO ANOTHER. SEPT. 30, 1975. BEL. 0819383.
3,916,171.—COUNTING CIRCUIT. OCT. 28, 1975.

3,989,368.—DUAL MODE CONTROL LOGIC FOR A MULTI-MODE COPIER DUPLICATOR. NOV. 2, 1976. BEL. 0819384.
4,019,028.—PRINTING MACHINE WITH VARIABLE COUNTER CONTROL SYSTEM. APR. 19, 1977. BEL. 0812560, GRB. 1451992, ITL. 1010688, SPN. 0424462.

Class 6H

3,062,536.—SHEET STRIPPING APPARATUS. NOV. 6, 1962. ARG. 0174781, CAN. 0736834, PNM. 0001999, VZL. 0023703.
3,090,616.—SHEET HANDLING CONTROL APPARATUS. MAY 21, 1963. CAN. 0683777.
3,339,069.—CORONA CHARGING DEVICE W/MEANS TO PREVENT TONER DUST CONTAMINATION. AUG. 29, 1967. CAN. 0788539, FRA. 1450010, GRB. 1116687, ITL. 0730715, JAP. 0875339, MEX. 0089459.
3,357,400.—ELECTROSTATIC APPARATUS FOR PAPER DETACKING. DEC. 12, 1967. CAN. 0841229, MEX. 0100315.
3,450,402.—SHEET STRIPPER APPARATUS. JUNE 17, 1969.
3,506,259.—ELECTROSTATIC SHEET DETACKING APPARATUS. APR. 14, 1970. ARG. 0177881, AUS. 0418161, BEL. 0721966, CAN. 0848612, FRA. 1585343, GRB. 1230113, ITL. 0895052, MEX. 0104231.
3,578,859.—MECHANICAL STRIPPING APPARATUS. MAY 18, 1971. ARG. 0185526, AUS. 0445289, BEL. 0752938, CAN. 0922771, CHL. 0025913, EGR. 0085002, FRA. 7024669, GRB. 1296763, GUA. 0002611, ITL. 0900197, MEX. 0117139, PLD. 0081340, PNM. 0002049, SPN. 0381384, STZ. 0523150, SWD. 0366849, TIW. 0007785, USR. 0443525, VZL. 0032781.
3,620,615.—SHEET STRIPPING APPARATUS. NOV. 16, 1971. CAN. 0927472, GRB. 1290518.
3,704,881.—TRANSFER SHEET PEELING DEVICE FOR XEROGRAPHIC APPARATUS. DEC. 5, 1972.
3,774,907.—VACUUM SHEET STRIPPING APPARATUS. NOV. 27, 1973. CAN. 0966519.
3,804,401.—PNEUMATIC STRIPPING APPARATUS. APR. 16, 1974. CAN. 0998705.
3,811,670.—ELECTROSTATOGRAPHIC APPARATUS WITH AIR BAFFLE. MAY 21, 1974.
3,819,175.—VACUUM STRIPPING ROLL WITH STATIONARY PICKUP SLOTS. JUNE 25, 1974.
3,820,778.—VACUUM STRIPPING ROLL WITH ROTARY PICKUP SLOTS. JUNE 28, 1974. CAN. 1010081, GRB. 1430856.
3,826,568.—SHEET TRANSPORT SYSTEM. JULY 30, 1974. CAN. 1001104.
3,837,640.—STRIPPER FINGER WITH AIR CUSHION. SEPT. 24, 1974. CAN. 1002077, FRA. 7338663, GRB. 1427058, ITL. 998964.
3,857,560.—ADHESIVE PAPER PICK-OFF SYSTEM. DEC. 31, 1974.
3,885,785.—VACUUM TRANSPORT. MAY 27, 1975. CAN. 1008892, FRA. 7437717.
3,885,786.—STRIPPER FINGER. MAY 27, 1975. GRB. 1402956.
3,891,206.—SHEET STRIPPING APPARATUS. JUNE 24, 1975. CAN. 1003868, GRB. 1449754.
3,895,793.—VACUUM SHEET STRIPPER. JULY 22, 1975. CAN. 1014179.
3,907,280.—FLEXIBLE SHEET HANDING DEVICE. SEPT. 23, 1975. FRA. 7322885.
3,940,126.—SHEET HANDLING MECHANISM. FEB. 24, 1976. GRB. 1450219.
3,948,507.—COPYING STRIPPER. APR. 6, 1976.
3,970,381.—METHOD AND APPARATUS FOR XEROGRAPHIC REPRODUCTION. JULY 20, 1976. BEL. 0811188, FRA. 7406478, GRB. 1451288, ITL. 1008269, SPN. 0423529, STZ. 5672880.
3,991,999.—REVOLVING STRIPPER FINGER. NOV. 16, 1976.
3,992,000.—SHEET STRIPPER. NOV. 16, 1976.
3,998,536.—METHOD & APPARATUS FOR ELECTROSTATIC PAPER STRIPPING. DEC. 21, 1976.
4,004,802.—SHEET STRIPPING DEVICE. JAN. 25, 1977.
4,017,065.—TRANSFER FUSING SPEED COMPENSATION. APR. 12, 1977.
4,017,067.—TRANSFER-FUSING SPEED COMPENSATION. APR. 12, 1977.
4,026,541.—SHEET STRIPPING DEVICE. MAY 31, 1977.

Class 6I

RE.27,720.—SIGNAL STORAGE DEVICE - RE OF 3,416,861-D1593. AUG. 7, 1973.
1,976,156.—PAPER CUTTING MACHINE. OCT. 9, 1934.
2,043,004.—PHOTOCOPY MACHINE. JUNE 2, 1936.
2,047,478.—PAPER FEEDING AND CUTTING MECHANISM. JULY 14, 1936.
2,216,629.—SLITTING AND CUTOFF MECHANISM FOR SHEET MATERIAL. OCT. 1, 1940.
3,075,493.—XEROGRAPHIC APPARATUS WITH WEB CUTTING MEANS. JAN. 29, 1963. CAN. 0682231, FRA. 1280975, GER. 1177487, GRB. 0979161, JAP. 0502929.
3,105,425.—WEB MARKING AND CUTTING APPARATUS FOR XEROGRAPHIC REPRODUCING DEVICES. OCT. 1, 1963. CAN. 0701949.
3,135,179.—XEROGRAPHIC APPARATUS. JUNE 2, 1964.
3,135,180.—XEROGRAPHIC APPARATUS. JUNE 2, 1964.
3,244,084.—WEB MARKING DEVICE FOR XEROGRAPHIC REPRODUCING APPARATUS. APR. 5, 1966.
3,401,613.—WEB CUTTER CONTROL DEVICE FOR XEROGRAPHIC REPRODUCING APPARATUS. SEPT. 17, 1968. CAN. 0786141, GRB. 1118217, JAP. 0517506.
3,402,628.—CUTTING APPARATUS. SEPT. 24, 1968. CAN. 0847666, GRB. 1137800.
3,416,061.—SIGNAL STORAGE DEVICE—REISSUED D72104—27,720. DEC. 17, 1968. CAN. 0824770, GER. 1524998, GRB. 1184579, JAP. 0571176.
3,418,046.—SIGNAL STORAGE DEVICE. DEC. 24, 1968. CAN. 0852814, GER. 1524999, GRB. 1190084, JAP. 0589515.
3,466,959.—WEB MATERIAL HANDLING APPARATUS. SEPT. 16, 1969.
3,485,622.—PRINTING OF TIMING MARKS IN XEROGRAPHIC PROCESS. DEC. 23, 1969. FRA. 1488142, GER. 1522700, GRB. 1047451, JAP. 0608701.
3,504,586.—ROLL CONVERTER CONTROL. APR. 7, 1970.
3,506,175.—ROLL STOCK CONVERTING APPARATUS. APR. 14, 1970.
3,585,289.—FACSIMILE RECORDING APPARATUS WITH CAM OPERATED PAPER CUTTER. JUNE 15, 1971.
3,591,279.—CUT AND DEFLECT WEB DRIVE APPARATUS. JULY 6, 1971. CAN. 0924635, FRA. 7019910, GRB. 1307549, ITL. 0893691.
3,639,053.—WEB CUTTING AND FEEDING APPARATUS. FEB. 1, 1972. ARG. 0192554, AUS. 0461657, BEL. 0749786, CAN. 0917974, FRA. 7015812, GRB. 1314727, ITL. 0900026, MEX. 0116866, SAF. 0703019, SPN. 0379248, STZ. 0516181, SWD. 7006081.
3,728,920.—CUT AND DEFLECT WEB DRIVE APPARATUS. APR. 24, 1973.
3,743,409.—CUTTER ASSEMBLY. JULY 3, 1973. BEL. 0784635, CAN. 0974447, FRA. 7220418, GRB. 1400465, ITL. 0956414.
3,855,890.—SLITTER/PERFORATOR APPARATUS. DEC. 24, 1974. BEL. 808873, CAN. 0996462, FRA. 7345296, GRB. 1423770, ITL. 1001152, USR. 0546267.
3,882,744.—ELECTROSTATOGRAPHIC WEB FEEDING APPARATUS. MAY 13, 1975. FRA. 7417339.
3,931,090.—RUBBER COMPOSITIONS FOR FLEXIBLE BELTS. JAN. 6, 1976.

Class 6J

3,380,733.—SHEET STRIPPING APPARATUS. APR. 30, 1968. ATR. 0268045, AUS. 0413138, BEL. 0689067, CAN. 0819593, DNK. 0112289, FRA. 1499560, GER. 1522704, GRB. 1157342, HOL. 0151191, ITL. 0788572, JAP. 0560087, LXB. 0052213, MEX. 0101989, NOR. 0122220, NZL. 0146848, PTG. 0046633, SAF. 0666572, SPN. 0332819, STZ. 0468661, SWD. 0326103, USR. 0261292.
3,416,791.—DOCUMENT INVERTING APPARATUS. DEC. 17, 1968. CAN. 0853562, GRB. 1210564, JAP. 0648074.
3,548,783.—PAPER TRANSPORT - SHEET TURNER - PAPER TRANSPORT-90 DEG TURN. DEC. 22, 1970.
3,627,312.—RESTACKING APPARATUS. DEC. 14, 1971. AUS. 0447183, BEL. 0752942, CAN. 0922747, CHL. 0025830, EGR. 0084128, FRA. 7024663, GRB. 1312303, GUA. 0002616, ITL. 0900193, JAP. 791920, MEX. 0114980, PLD. 0081346, PNM. 0001953, SPN. 0381379, STZ. 0525779, SWD. 0359381, TIW. 0022313, VZL. 0032782.
3,856,295.—INVERTER-REVERSER FOR A REPRODUCTION MACHINE. DEC. 24, 1974.
3,862,802.—SHEET REVERSING APPARATUS AND A DUPLEX REPRODUCING APPARATUS EMPLOYING SAME. JAN. 28, 1975. BEL. 0818894.
3,942,785.—SELF-ACTUATING SHEET INVERTER-REVERSER. MAR. 9, 1976.
3,944,212.—SHEET REVERSING MECHANISM. MAR. 16, 1976.
3,947,270.—REPRODUCING APPARATUS AND PROCESS FOR DUPLEX IMAGING IN A SINGLE PASS. MAR. 30, 1976.

Class 6K

D.227,933.—SORTER. JULY 24, 1973.
D.230,515.—DOCUMENT REPRODUCING AND SORTING MACHINE. FEB. 26, 1974.
D.233,937.—SORTER. DEC. 17, 1974.
D.236,030.—PAPER TRAY. JULY 22, 1975.
3,395,913.—SHEET MATERIAL DISTRIBUTION SYSTEM. AUG. 6, 1968. AUS. 0409539, BEL. 0704922, CAN. 0832159, FRA. 1543565, GRB. 1193517, ITL. 0823413, JAP. 0645590, MEX. 0101165, USR. 0343419.
3,460,824.—MODULAR SHEET DISTRIBUTOR. AUG. 12, 1969. ARG. 0175858, ATR. 0304588, AUS. 0443802, CAN. 0871013, CHL. 0023362, CLB. 0016672, EIR. 0031307, FIN. 0047868, GRB. 1193514, IND. 0112001, ISR. 0028521, JAP. 0645589, MEX. 0099178, NOR. 0125174, NZL. 0149789, PAK. 0119258, PLP. 0006159, PRU. 0009362, SAF. 0674987, SPN. 0344350, STZ. 0478049, SWD. 0342203, TRK. 0014721, URG. 0008514, VZL. 0016672.
3,484,101.—SORTING APPARATUS FOR DOCUMENTS. DEC. 16, 1969. CAN. 0889441, GRB. 1246033.
3,552,739.—SHEET HANDLING APPARATUS. JAN. 5, 1971. BEL. 0738575, CAN. 0921945, FRA. 6930567, GRB. 1274277, ITL. 0871023.
3,565,420.—DOCUMENT FEEDING APPARATUS. FEB. 23, 1971. ARG. 0184075, AUS. 0453309, BEL. 0750391, CAN. 0922328, EGR. 0082941, FRA. 7017112, GRB. 1305825, ITL. 0893198, MEX. 0117914, PLD. 0082841, SPN. 0379694, STZ. 0513435, SWD. 0368797, USR. 0476767.
3,589,808.—REPRODUCING APPARATUS. JUNE 29, 1971. CAN. 0917482.
3,618,936.—JAM DETECTION SYSTEM FOR SORTING APPARATUS. NOV. 9, 1971. AUS. 0445492, BEL. 0758059, CAN. 0949671, EGR. 0088009, FRA. 7041622, GRB. 1324119, ITL. 0909902, PLD. 0081147, SPN. 0385034, STZ. 0525723, TIW. 0007648.
3,622,061.—STAPLE FEED AND FASTENING APPARATUS. NOV. 23, 1971.
3,630,607.—SET SEPARATION COPIER SYSTEM. DEC. 28, 1971.
3,649,006.—SHEET HANDLING APPARATUS. MAR. 14, 1972. BEL. 0762643, CAN. 0944310, FRA. 7104922, GRB. 1341286, ITL. 0918344, JAP. 0795150.
3,652,875.—CONTROL CIRCUIT FOR DRIVING STAPLING MECHANISM. MAR. 28, 1972.
3,669,447.—SHEET PROPELLING APPARATUS. JUNE 13, 1972. CAN. 0938624.
3,671,094.—COVER APPARATUS. JUNE 20, 1972.
3,682,328.—TRAY APPARATUS. AUG. 8, 1972.
3,685,712.—STAPLING APPARATUS. AUG. 22, 1972. CAN. 0953851.
3,690,537.—STAPLE FORMING AND FASTENING APPARATUS. SEPT. 12, 1972.
3,695,756.—SHEET STRIPPING APPARATUS. OCT. 3, 1972. BEL. 0774563, CAN. 0950931, FRA. 7139637, GRB. 1366909, ITL. 0937673.
3,707,418.—METHOD OF BINDING. DEC. 26, 1972. CAN. 0974723, EGR. 0094346, GRB. 1359338.
3,709,485.—CONTROL CIRCUIT FOR SORTING SYSTEM. JAN. 9, 1973.
3,709,492.—SORTING APPARATUS. JAN. 9, 1973. ARG. 0194366, AUS. 0457968, BEL. 0783854, CAN. 0968300, FRA. 7218317, GRB. 1365399, ITL. 0955692, MEX. 0127721, SPN. 0403108, STZ. 0555198.
3,719,266.—SHEET STACKING APPARATUS. MAR. 6, 1973.
3,735,978.—METHOD AND APPARATUS FOR STACKING COPY SHEETS. MAY 29, 1973. ARG. 0190825, BEL. 0772406, CAN. 0951340, FRA. 7133309, GRB. 1358420, ITL. 0936377, MEX. 0125745.
3,788,640.—MOVING BIN SORTING APPARATUS. JAN. 29, 1974. CAN. 0996495, FRA. 7346312, GRB. 1429726.
3,793,016.—ELECTROPHOTOGRAPHIC SHEET BINDING PROCESS. FEB. 19, 1974.
3,794,550.—SHEET BINDING. FEB. 26, 1974. CAN. 1012583, GRB. 1431286.
3,833,911.—REPRODUCTION SYSTEM AND METHOD WITH SIMPLEX AND DUPLEX MODES OF OPERATION. SEPT. 3, 1974.
3,841,754.—DUPLEX REPRODUCTION SYSTEM. OCT. 15, 1974.
3,841,827.—DUPLEX REPRODUCTION SYSTEM. OCT. 15, 1974. BEL. 0816155, FRA. 7419739, GER. 7409422, GRB. 1441370.
3,845,949.—SORTER CONTROL TO PREVENT OVERSTACKING IN THE SORTER TRAYS. NOV. 5, 1974. BEL. 808173, CAN. 1005511, FRA. 7342816, GRB. 1436599, ITL. 1002130, SPN. 0421148.
3,848,995.—COPIER/DUPLICATOR SYSTEM. NOV. 19, 1974. BEL. 0815548, GRB. 1450847, ITL. 1012907, SPN. 0426782.
3,861,219.—METHOD FOR MEASURING HEAT AND PRESSURE CHARACTERISTICS OF FUSING APP. JAN. 21, 1975. CAN. 1013807.
3,861,861.—FUSER ROLL CLEANING APPARATUS. JAN. 21, 1975.
3,866,904.—MULTIPLE FEED SORTING APPARATUS. FEB. 18, 1975. CAN. 1001109, GRB. 1432790.
3,868,019.—TRAY APPARATUS. FEB. 25, 1975. FRA. 7346312, CAN. 0996495, FRA. 7346912, GRB. 1429726.
3,870,295.—SORTER SUPPLEMENT CONTROL. MAR. 11, 1975. CAN. 1007283.
3,871,643.—SORTER CONTROL. MAR. 18, 1975. BEL. 808172, CAN. 1000647, GRB. 1422029, ITL. 1002129, SPN. 0421116.
3,878,818.—CLEANING APPARATUS FOR DRY FUSER ROLLS. APR. 22, 1975. FRA. 7427783, GRB. 1464759.
3,880,119.—DEVELOPMENT APPARATUS. APR. 29, 1975.
3,902,709.—BINLESS SORTER. SEPT. 2, 1975. FRA. 7436985.
3,907,276.—WOBBLE JOGGER. SEPT. 23, 1975.
3,908,978.—BINLESS SORTING APPARATUS. SEPT. 30, 1975. CAN. 0996586, GRB. 1426020.
3,917,256.—DUAL PURPOSE SHEET HANDLING APPARATUS. NOV. 4, 1975. CAN. 1014098.
3,917,257.—SHEET INVERTER APPARATUS. NOV. 4, 1975. CAN. 1005009, FRA. 7336309, GRB. 1430620.
3,938,802.—SHEET STACKING APPARATUS. FEB. 17, 1976. CAN. 1010462, GRB. 1431605.
3,941,369.—SHEET DISTRIBUTING APPARATUS. MAR. 2, 1976.
3,947,018.—UNIVERSAL FEEDER-STACKER. MAR. 30, 1976. BEL. 0836262.
3,953,023.—BIN INDICATOR DEVICE. APR. 27, 1976.
3,971,554.—SHEET STACKER. JULY 27, 1976.
3,973,769.—COMPACT SORTING APPARATUS. AUG. 10, 1976. BEL. 0836261.
3,977,667.—SORTING APPARATUS. AUG. 31, 1976.
3,988,817.—PRESSURE ROLL FOR FUSER APPARATUS. NOV. 2, 1976.
3,990,695.—SORTING APPARATUS. NOV. 9, 1976.
3,995,748.—SORTER APPARATUS. DEC. 7, 1976. BEL. 0844420.
4,011,952.—MANUAL SORTER. MAR. 15, 1977.
4,012,034.—MULTIPLE MODULAR SORTER ASSEMBLY. MAR. 15, 1977.
4,012,035.—SORTER CONTROL SYSTEM. MAR. 15, 1977.
4,015,841.—SORTER. APR. 5, 1977.
4,022,458.—SHEET DISTRIBUTION APPARATUS. MAY 10, 1977.
4,029,309.—SET TRANSPORT AND STACKER. JUNE 14, 1977. BEL. 0847844.
4,033,579.—AN OFFSET STACKER. JULY 5, 1977.
4,037,832.—IMPROVED SORTER APPARATUS. JULY 26, 1977.
4,038,594.—DISTORTIONLESS LINE WAVE AMPLIFICATION. JULY 26, 1977.

Class 7

3,784,300.—PRE-TRANSFER STATION. JAN. 8, 1974. AUS. 0465154, BEL. 0789340, CAN. 1000782, EGR. 0106095, FRA. 7234200, GRB. 1379826, ITL. 0972691, MEX. 0128584, SPN. 0409975, STZ. 0557051, SWD. 7215168.
3,809,471.—PHOTOELECTROPHORETIC IMAGING APPARATUS WITH CORRECTION FOR PARALLAX. MAY 7, 1974.
3,819,263.—CLEANING APPARATUS. JUNE 25, 1974. ARG. 0200252, AUS. 0469469, BEL. 0796984, EGR. 0104374, FRA. 2177733, GRB. 1421929, ISR. 0041829, ITL. 0983618, MEX. 131438, SAF. 0732067, SPN. 0439774, STZ. 0556047, SWD. 7304022.

Class 7A

3,850,517.—HIGH SPEED PRINTOUT SYSTEM. NOV. 26, 1974.

Class 7A 1

3,051,041.—IMAGE PROJECTION. AUG. 28, 1962. CAN. 0734194, GRB. 0956359.
3,148,581.—CYLINDRICAL SURFACE PROJECTION APPARATUS. SEPT. 15, 1964.
3,273,999.—IMAGE DEFORMATION UTILIZING A PRISM. SEPT. 20, 1966. AUS. 0274351, CAN. 0840628, FRA. 1367772, GRB. 1034097, ITL. 0699466, SAF. 0002971, SWD. 0306232.

3,320,061.—MASKING BY TOTAL INTERNAL REFLECTION FOR IMAGE REPRODUCTION AND DISPLAY. MAY 16, 1967. CAN. 0847533, FRA. 1401615, GER. 1497081, GRB. 1065986, ITL. 0729029, JAP. 0471308.
3,481,668.—IMAGE PROJECTION APPARATUS. DEC. 2, 1969.
3,510,660.—METHOD FOR VISUAL COMPARISON OF INFORMATION. MAY 5, 1970. CAN. 0848611, GRB. 1201376, JAP. 0595641.
3,519,344.—IMAGE PROJECTION. JULY 7, 1970.
3,622,217.—LIGHT PRODUCING SYSTEM. NOV. 23, 1971.

Class 7A 2

3,196,765.—IMAGE DEVELOPMENT AND PROJECTION. JULY 27, 1965.
3,355,308.—PROJECTION TRANSPARENCY HAVING A TRANSPARENT POWDER IMGE. NOV. 28, 1967.
3,607,256.—FULLY-ENCLOSED ELECTROPHORETIC IMAGING SYSTEM. SEPT. 21, 1971.

Class 7A 2A

3,999,038.—FLARED FUSER ROLLL. DEC. 21, 1976.

Class 7B

3,501,294.—METH OF TREATNG SURFACE OF XIC PLATE W/METAL SALT OF A FATTY ACID TO IMPROVE IMAGE TRANSFER. MAR. 17, 1970. ARG. 0168294, AUS. 0419434, BEL. 0706369, CAN. 0880230, CHL. 0027764, FRA. 1544449, GRB. 1209644, ITL. 0822799, MEX. 0102265, PNM. 0002797, SWD. 0340047, VZL. 0023670.
3,690,754.—CONTROL SYSTEM FOR AN OPTICAL IMAGING SYSTEM. SEPT. 12, 1972. CAN. 0949797, GRB. 1337420.
3,884,825.—IMAGING COMPOSITION. MAY 20, 1975. AUS. 0467835, BEL. 0802879, CAN. 0995963, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 0417382.
3,973,843.—ELECTROSTATOGRAPHIC IMAGING APPARATUS. AUG. 10, 1976. AUS. 0467835, BEL. 0802879, CAN. 0995963, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 0417382.

Class 7C

2,576,047.—METHOD AND APPARATUS FOR PRINTING ELECTRICALLY. NOV. 20, 1951. AUS. 0150449, CAN. 0485073, GER. 0919891, GRB. 0675398, STZ. 0286141, SWD. 0163889.
2,681,473.—MANUFACTURE OF PLAQUES AND THE LIKE. JUNE 22, 1954.
2,684,901.—IMAGE TRANSFER DEVICE. JULY 27, 1954.
2,847,305.—XEROGRAPHIC TRANSFER PROCESS. AUG. 12, 1958.
2,919,191.—XEROGRAPHIC TRANSFER METHOD. DEC. 29, 1959.
2,951,443.—IMAGE REPRODUCTION. SEPT. 6, 1960. AUS. 0243878, FRA. 1247806, GRB. 0887232, ITL. 0622716, JAP. 0320090.
3,063,859.—METHOD AND APPARATUS FOR TRANSFERRING IMAGES FROM XEROGRAPHIC TO METALLIC PLATES. NOV. 13, 1962.
3,071,070.—METHOD AND APPARATUS FOR TRANSFERRING IMAGES FROM XEROGRAPHIC TO METALLIC PLATES. JAN. 1, 1963. CAN. 0638821.
3,620,616.—TRANSFER DRUM WITHDRAWAL APPARATUS. NOV. 16, 1971. BEL. 0751487, CAN. 0923543, FRA. 7020458, GRB. 1300267, ITL. 0893835.
3,633,543.—BIASED ELECTRODE TRANSFER APPARATUS. JAN. 11, 1972. CAN. 0914398, GRB. 1337123, JAP. 783769.
3,781,105.—CONSTANT CURRENT BIASING TRANSFER SYSTEM. DEC. 25, 1973. FRA. 7341869, GRB. 1448385.
3,795,441.—TRANSFER ROLLER. MAR. 5, 1974.
3,822,093.—TRANSFER REGULATING APPARATUS. JULY 2, 1974. FRA. 7428422.
3,830,589.—CONDUCTIVE BLOCK TRANSFER SYSTEM. AUG. 20, 1974.
3,832,053.—BELT TRANSFER SYSTEM. AUG. 27, 1974.
3,832,055.—FORAMINOUS VACUUM BIAS ROLL TRANSFER SYSTEM. AUG. 27, 1974. CAN. 0999316.
3,837,741.—CONTROL ARRANGEMENT FOR TRANSFER ROLL POWER SUPPLY. SEPT. 24, 1974.
3,837,883.—IMAGE TRANSFER PROCESS. SEPT. 24, 1974. ARG. 0203811, AUS. 0461437, BEL. 0760456, CAN. 0947368, FRA. 7047140, GRB. 1339577, ITL. 0913634, MEX. 0119591, SWD. 7017139.
3,842,800.—TRANSFER ROLLER ASSEMBLY. OCT. 22, 1974. BEL. 0793553, CAN. 9780221, FRA. 7237770, GRB. 1412454, ITL. 0973320, SPN. 0410173, SWD. 7216978.
3,846,020.—ELECTROSTATIC SHEET TRANSPORT SYSTEM. NOV. 5, 1974.
3,847,119.—TRANSFER ROLLER ASSEMBLY. NOV. 12, 1974. ARG. 0196224, ATR. 327002, AUS. 0464751, BEL. 0796983, CAN. 0977206, EGR. 0103979, FRA. 7305277, GER. 0103979, GRB. 1413711, ISR. 0041830, ITL. 0983617, MEX. 131018, SAF. 0722068, SPN. 0413018, STZ. 0558033, SWD. 7304021.
3,847,478.—SEGMENTED BIAS ROLL. NOV. 12, 1974.
3,848,204.—PRESSURE ADJUSTABLE ELECTROPHOTOGRAPHIC PRINTING MACHINE TRANSFER APPARATUS. NOV. 12, 1974.
3,860,436.—CONSTANT CURRENT BIASING TRANSFER SYSTEM. JAN. 14, 1975. FRA. 7341869, GRB. 1448385.
3,866,572.—FORAMINOUS ELECTROSTATOGRAPHIC TRANSFER SYSTEM. FEB. 18, 1975. BEL. 0815546, CAN. 1009503, FRA. 7418641, GRB. 1448386, ITL. 1012842, SPN. 0426760.
3,877,416.—HUMIDITY CORRECTED TRANSFER APPARATUS. APR. 15, 1975. BEL. 0814054, GRB. 1445671, ITL. 1009955, STZ. 0573612.
3,888,208.—IMAGE TRANSFER PROCESS. JUNE 10, 1975.
3,901,186.—TRANSFER ROLLER ASSEMBLY. AUG. 26, 1975. BEL. 0816848, FRA. 7423024.
3,924,943.—SEGEMENTED BIASED TRANSFER MEMBER. DEC. 9, 1975.
3,936,175.—INTERNALLY SHIELDED TRANSFER ROLLER. FEB. 3, 1976.
3,942,888.—STEPPED TRANSFER ROLLER. MAR. 9, 1976.
3,957,367.—A COLOR ELECTROSTATOGRAPHIC PRINTING MACHINE. MAY 18, 1976.
3,959,574.—BIASABLE MEMBER AND METHOD FOR MAKING. MAY 25, 1976.
3,994,579.—TRANSFER SYSTEM FOR ELECTROPHOTOGRAPHIC PRINTING. NOV. 30, 1976.
4,014,605.—TRANSFER SYSTEM WITH TAILORED ILLUMINATION. MAR. 29, 1977.
4,023,894.—TRANSFER APPARATUS. MAY 17, 1977.
4,025,182.—A TRANSFER APPARATUS FOR A COLOR ELECTROPHOGRAPHIC PRINTING MACHINE. MAY 24, 1977.

Class 7C 1

2,626,865.—PORTABLE ELECTROPHOTOGRAPHIC POWDER-IMAGE TRANSFER MECHANISM. JAN. 27, 1953.
2,684,902.—IMAGE TRANSFER MECHANISM FOR ELECTROSTATICALLY ADHERING IMAGES. JULY 27, 1954. CAN. 0532395.
2,807,232.—XEROGRAPHIC POWDER-IMAGE TRANSFER SQUEEGEE. SEPT. 24, 1957.
2,812,709.—MULTIPLE COPY TRANSFER PROCESS AND APPARATUS. NOV. 12, 1957. CAN. 0603435.
2,995,108.—XEROGRAPHIC POWDER IMAGE TRANSFER APPARATUS. AUG. 8, 1961.
3,150,003.—APPARATUS FOR TRANSFERRING XEROGRAPHIC IMAGES. SEPT. 22, 1964.
3,150,004.—XEROGRAPHIC TRANSFER APPARATUS. SEPT. 22, 1964.
3,244,083.—XEROGRAPHIC DEVICE. APR. 5, 1966. AUS. 0284069, CAN. 0710975, FRA. 1379820, GRB. 1030449, JAP. 0654006.
3,339,069.—CORONA CHARGING DEVICE W/MEANS TO PREVENT TONER DUST CONTAMINATION. AUG. 29, 1967. CAN. 0788539, FRA. 1450010, GRB. 1116687, ITL. 0730715, JAP. 0875339, MEX. 0089459.
3,357,325.—XEROGRAPHIC TRANSFER APPARATUS. DEC. 12, 1967. CAN. 0812525.
3,444,369.—METHOD AND APPARATUS FOR SELECTIVE CORONA TREATMENT OF TONER PARTICLES. MAY 13, 1969. ARG. 0167581, ATR. 0288863, AUS. 0415969, BEL. 0704919, BRA. 6791610, CAN. 0845871, DNK. 0119094, FRA. 1540696, GER. 1597884, GRB. 1203811, HOL. 0152375, ITL. 0853627, JAP. 0587935, MEX. 0099470, SPN. 0345918, STZ. 0487438, SWD. 0337986, VZL. 0023669.
3,765,330.—XEROPRINTING EMPLOYING LETTER PRESS SURFACE COVERED WITH A LAYER OF RESISTIVE MATERIAL. OCT. 16, 1973. CAN. 0949806, GRB. 1374651.
3,850,519.—XEROGRAPHIC IMAGE TRANSFER APPARATUS. NOV. 26, 1974. ARG. 0202116, BEL. 0809579, GRB. 1446252, ITL. 1006786, MEX. 0135278, SPN, 0422230, STZ. 0567748, SWD. 7400197, VZL. 0033340.

3,870,515.—METHOD FOR ELECTROSTATIC PAPER STRIPPING BY NEUTRALIZATION OF TRANSFER CHARGE. MAR. 11, 1975.
3,877,417.—TRANSFER CORONA GENERATING DEVICE WITH SUPPORT BRUSHES. APR. 15, 1975.
3,918,403.—CORONA TRANSFER MECHANISM. NOV. 11, 1975.
3,920,325.—MOISTURE STABLE BIAS TRANSFER ROLL. NOV. 18, 1975.
3,966,199.—BELT TRANSFER LOADING SYSTEM. JUNE 29, 1976.
4,014,606.—REPRODUCTION MACHINE WITH TEXTURED TRANSFER ROLLER. MAR. 29, 1977.
4,017,065.—TRANSFER FUSING SPEED COMPENSATION. APR. 12, 1977.
4,017,067.—TRANSFER-FUSING SPEED COMPENSATION. APR. 12, 1977.

Class 7C 1A

2,892,708.—XEROGRAPHIC TRANSFER PROCESS. JUNE 30, 1959.
3,004,860.—INDUCTION POWDER TRANSFER. OCT. 17, 1961. AUS. 0222781, CAN. 0647848, FRA. 1205569, GER. 1131707, GRB. 0886730, ITL. 0599628, JAP. 0318804.
3,319,604.—XEROGRAPHIC TRANSFER APPARATUS. MAY 16, 1967.

Class 7C 2

3,132,037.—XEROGRAPHIC TRANSFER METHOD. MAY 5, 1964. CAN. 0727919.
3,132,050.—XEROGRAPHIC TRANSFER APPARATUS. MAY 5, 1964.
3,795,441.—TRANSFER ROLLER. MAR. 5, 1974.
3,817,616.—THERMAL CHAMBER FOR DEVELOPABILITY REGULATING APPARATUS. JUNE 18, 1974. CAN. 0991247, GRB. 1439527.
3,838,918.—TRANSFER APPARATUS. OCT. 1, 1974. BEL. 0811434, GRB. 1445243, ITL. 1008903.
3,892,962.—THERMAL CHAMBER FOR A DEVELOPABILITY REGULATING APPARATUS. JULY 1, 1975. CAN. 0991247, GRB. 1439527.

Class 7C 3

2,812,709.—MULTIPLE COPY TRANSFER PROCESS AND APPARATUS. NOV. 12, 1957. CAN. 0603435.
2,951,443.—IMAGE REPRODUCTION. SEPT. 6, 1960. AUS. 0243878, FRA. 1247806, GRB. 0887232, ITL. 0622716, JAP. 0320090.
3,004,860.—INDUCTION POWDER TRANSFER. OCT. 17, 1961. AUS. 0222781, CAN. 0647848, FRA. 1205569, GER. 1131707, GRB. 0886730, ITL. 0599628, JAP. 0318804.
3,244,083.—XEROGRAPHIC DEVICE. APR. 5, 1966. AUS. 0284069, CAN. 0710975, FRA. 1379820, GRB. 1030449, JAP. 0654006.
3,612,677.—ELECTROSTATIC TRANSFER APPARATUS. OCT. 12, 1971. CAN. 0941220, GRB. 1296742.
3,697,170.—AUTOMATIC DUPLEXING APPARATUS. OCT. 10, 1972. CAN. 0948269.
3,697,171.—SIMULTANEOUS IMAGE TRANSFER. OCT. 10, 1972. ARG. 0192330, AUS. 0461728, BEL. 0777016, CAN. 0948267, FRA. 7146256, GRB. 1368456, ITL. 0944212, MEX. 0124562, SWD. 0366123, VZL. 32765.
3,702,482.—BIAS ROLL TRANSFER. NOV. 7, 1972. ARG. 0191238, BEL. 0777017, CAN. 0962890, FRA. 7146257, GRB. 1368500, ITL. 0944209, MEX. 0126775.
3,734,015.—SINGLE PASS DUPLEXING BY SEQUENTIAL TRANSFER. MAY 22, 1973. ARG. 0192332, BEL. 7777018, CAN. 0948691, FRA. 7146258, GRB. 1368496, ITL. 0944211, MEX. 0124992.
3,902,801.—COLOR CORRECTED PRINTING SYSTEM. SEPT. 2, 1975. GRB. 1465590.

Class 7C 4

2,812,709.—MULTIPLE COPY TRANSFER PROCESS AND APPARATUS. NOV. 12, 1957. CAN. 0603435.
3,004,860.—INDUCTION POWDER TRANSFER. OCT. 17, 1961. AUS. 0222781, CAN. 0647848, FRA. 1205569, GER. 1131707, GRB. 0886730, ITL. 0599628, JAP. 0318804.
3,444,369.—METHOD AND APPARATUS FOR SELECTIVE CORONA TREATMENT OF TONER PARTICLES. MAY 13, 1969. ARG. 0167581, ATR. 0288863, AUS. 0415969, BEL. 0704919, BRA. 6791610, CAN. 0845871, DNK. 0119094, FRA. 1540696, FRA. 1540696, GRB. 1203811, HOL. 0152375, ITL. 0853627, JAP. 0587935, MEX. 0099470, SPN. 0345918, STZ. 0487438, SWD. 0337986, VZL. 0023669.
3,640,249.—TRANSFER APPARATUS. FEB. 8, 1972. BEL. 0758058.
3,647,292.—TRANSFER APPARATUS. MAR. 7, 1972. AUS. 0450919, BEL. 0759452, CAN. 0919004, FGR. 0086978, FRA. 7043065, GRB. 1319148, ITL. 0909441, JAP. 0773213, SPN. 0385845, STZ. 0519187, SWD. 7015876.
3,650,617.—SWITCHING DETECTOR-A. MAR. 21, 1972.
3,650,618.—SWITCHING DETECTOR-B. MAR. 21, 1972.
3,687,545.—SHORT FOCAL LENTH OPTICAL IMAGING SYSTEM. AUG. 29, 1972. BEL. 0747977, CAN. 0913438, FRA. 7011547, GRB. 1300156, ITL. 0898935, JAP. 0731226.
3,729,311.—ELECTROSTATIC TRANSFER METHOD. APR. 24, 1973.
3,854,974.—METHOD FOR TRANSFERRING A TONER IMAGE. DEC. 17, 1974.
3,926,824.—ELECTROSTATOGRAPHIC DEVELOPER COMPOSITION. DEC. 16, 1975. ARG. 0192480, AUS. 0466319, BEL. 0793098, CAN. 0985552, FRA. 7245403, GRB. 1417179, ITL. 0973327, SPN. 0410171, STZ. 0028663, SWD. 7216977.
3,932,035.—APPARATUS FOR TRANSFERRING A TONER IMAGE. JAN. 13, 1976.
3,994,726.—LAMINATED FLEXIBLE PHOTORECEPTOR. NOV. 30, 1976. GRB. 1429517.
4,002,476.—METHOD OF DEVELOPING RESILIENT PHOTOCONDUCTIVE ELEMENT. JAN. 11, 1977. GRB. 1429517.
4,023,967.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPMENT METHOD IN WHICH A UNIFORM SUBSTANTIAL INTERFACE CONTACT. MAY 17, 1977. BEL. 0819537, GRB. 1429518.

Class 7D

3,093,039.—APPARATUS FOR TRANSFERRING POWDER IMAGES AND METHOD THEREFOR. JUNE 11, 1963. CAN. 0744873.

Class 7E

3,013,526.—XEROGRAPHIC IMAGE TRANSFER APPARATUS. DEC. 19, 1961.
3,063,351.—XEROGRAPHIC POWDER IMAGE TRANSFER APPARATUS. NOV. 13, 1962. CAN. 0706541.
3,132,050.—XEROGRAPHIC TRANSFER APPARATUS. MAY 5, 1964.
3,375,781.—REGISTRATION MECHANISM FOR A REPRODUCTION MACHINE. APR. 2, 1968.
3,375,782.—PROGRAMMING MECHANISM FOR A REPRODUCTION MACHINE. APR. 2, 1968.
3,422,756.—PAPER SUPPORT AND REGISTRATION MEANS FOR REPRODUCTION MACHINE. JAN. 21, 1969.
3,499,374.—XEROGRAPHIC PRINTER. MAR. 10, 1970. AUS. 0415164, BEL. 0677146, CAN. 0846424, FRA. 1470069, GRB. 1135603, ITL. 0762255, MEX. 0091183, SWD. 0327142.
3,687,541.—XEROGRAPHIC DUPLEX TECHNIQUE. AUG. 29, 1972. CAN. 0948268.
3,847,642.—METHOD FOR TRANSFERRING ELECTROSTATOGRAPHICALLY FORMED IMAGES. NOV. 12, 1974.
3,848,204.—PRESSURE ADJUSTABLE ELECTROPHOTOGRAPHIC PRINTING MACHINE TRANSFER APPARATUS. NOV. 12, 1974.
3,854,974.—METHOD FOR TRANSFERRING A TONER IMAGE. DEC. 17, 1974.
3,867,168.—TRANSPARENCY. FEB. 18, 1975.
3,888,208.—IMAGE TRANSFER PROCESS. JUNE 10, 1975.
3,932,035.—APPARATUS FOR TRANSFERRING A TONER IMAGE. JAN. 13, 1976.
3,936,174.—TRANSFER ROLLER WITH STATIONARY INTERNAL ELECTRODE. FEB. 3, 1976.
3,954,332.—REPRODUCTION MACHINE WITH IMPROVED TRANSFER ROLL. MAY 4, 1976.
3,954,333.—TRANSFER ROLL HAVING MEANS FOR MONITORING AND CONTROLLING THE RESITIVITY THEREOF. MAY 4, 1976.
3,977,779.—ELECTROSTATOGRAPHIC TRANSFER WITH AIR. AUG. 31, 1976. GRB. 1459450.

Class 7E 1

2,992,758.—POWDER CLOUD GENERATING APPARATUS. JULY 18, 1961. CAN. 0678816.

3,013,878.—METHOD AND APPARATUS FOR TRANSFERRING AND FIXING XEROGRAPHIC IMAGES. DEC. 19, 1961.
3,063,859.—METHOD AND APPARATUS FOR TRANSFERRING IMAGES FROM XEROGRAPHIC TO METALLIC PLATES. NOV. 13, 1962.
3,071,070.—METHOD AND APPARATUS FOR TRANSFERRING IMAGES FROM XEROGRAPHIC TO METALLIC PLATES. JAN. 1, 1963. CAN. 0638821.
3,374,769.—TONER FUSING APPARATUS. MAR. 26, 1968. CAN. 0819836, FRA. 1396610, GER. 1522709, GRB. 1152067, JAP. 0534764.
3,685,896.—DUPLICATING METHOD AND APPARATUS. AUG. 22, 1972.
3,845,742.—FUSER ROLL CONSTRUCTION. NOV. 5, 1974. GRB. 1450882.
3,849,062.—REINFORCED FUSER ROLL CONSTRUCTION. NOV. 19, 1974.

Class 7E 2

2,995,085.—TRANSFER AND FIXING METHOD. AUG. 8, 1961. CAN. 0622688.
3,083,684.—APPARATUS FOR PATTERN REPRODUCTION. APR. 2, 1963.

Class 7E 3

2,661,289.—ADHESIVE TRANSFER AND FIXING APPARATUS. DEC. 1, 1953.
2,855,324.—CONTACT TRANSFER FOR XEROGRAPHY. OCT. 7, 1958. CAN. 0665467, FRA. 1170805, GER. 1036279, GRB. 0843502.
2,886,464.—CONTACT TRANSFER FOR XEROGRAPHY. MAY 12, 1959.
3,157,546.—IMAGE TRANSFER. NOV. 17, 1964. ATR. 0225034, BEL. 0602721 FRA. 1287124, GER. 1271547, GRB. 0985176, ITL. 0647042, JAP. 0414127, STZ. 0383417.
3,591,276.—METHOD AND APPARATUS FOR OFFSET XEROGRAPHIC REPRODUCTION. JULY 6, 1971. CAN. 0894931, GER. 1811893, GRB. 1245426, JAP. 0648075.
3,682,677.—BACKGROUND REMOVAL. AUG. 8, 1972.
3,690,252.—LITHOGRAPHIC INKING APPARATUS. SEPT. 12, 1972. CAN. 0919006.

Class 7E 3A

2,843,499.—PRESSURE TRANSFER OF XEROGRAPHIC IMAGES. JULY 15, 1958.
2,995,085.—TRANSFER AND FIXING METHOD. AUG. 8, 1961. CAN. 0622688.
3,003,891.—UNMOTTLED DYE TRANSFER. OCT. 10, 1961.
3,060,052.—TRANSFER OF XEROGRAPHIC DYE IMAGES. OCT. 23, 1962. AUS. 0242307, CAN. 0678380, FRA. 1246634, GRB. 0946761.

Class 8

3,961,236.—CONSTANT POWER REGULATOR FOR XEROGRAPHIC FUSING SYSTEM. JUNE 1, 1976.
4,027,138.—A FUSER RELEASE MATERIAL DISPENSER. MAY 31, 1977.

Class 8A

D.233,414.—TONER BOTTLE OR THE LIKE. OCT. 29, 1974.
2,990,278.—METHOD AND APPARATUS FOR TRANSFERRING AND FIXING XEROGRAPHIC IMAGES. JUNE 27, 1961.
3,130,064.—METHOD OF FORMING RESIN PATTERN ON A PAPER RECORD CARD. APR. 21, 1964.
3,778,222.—FIRE PREVENTION APPARATUS. DEC. 11, 1973.
3,830,590.—SORTER APPARATUS OF PRINTER SYSTEM. AUG. 20, 1974. AUS. 0466096, BEL. 0791361, CAN. 0998425, CHL. 0027890, EGR. 0102488, FRA. 7240557, GRB. 1400619, IND. 0137843, ISR. 0040831, ITL. 0970911, MEX. 0128646, NOR. 0135210, NZL. 0168971, PLP. 0008722, PTG. 0058789, SAF. 0728101, SPN. 0408628, STZ. 0560108.
3,834,861.—PRESSURE HEATED FUSER ASSEMBLY. SEPT. 10, 1974. GRB. 1424307.
3,847,391.—STACKING CONTROL APPARATUS. NOV. 12, 1974. ARG. 0194365, AUS. 0454812, BEL. 0783855, CAN. 0969205, FRA. 7218318, GRB. 1365400, ITL. 0955693, MEX. 0128712, SPN. 0403109, STZ. 0557242.
3,848,868.—SHEET SORTING APPARATUS. NOV. 19, 1974. CAN. 1005387, GRB. 1440557.
3,856,461.—REPRODUCTION MACHINE FUSER. DEC. 24, 1974.
3,856,462.—REPRODUCTION MACHINE FUSER. DEC. 24, 1974. BEL. 0821050, FRA. 7435222.
3,868,744.—CLEANING APPARATUS FOR HEATED PRESSURE ROLL FUSER. MAR. 4, 1975. AUS. 0466542, BEL. 0794569, CAN. 1007407, FRA. 7302888, GRB. 1424132, ITL. 0978560, SPN. 0410976, SWD. 7301015.
3,883,921.—CLEANING ROLL APPARATUS HAVING REJUVENATED CLEANING SURFACE. MAY 20, 1975.
3,936,658.—FUSER APPARATUS FOR ELECTROSTATIC REPRODUCING MACHINES. FEB. 3, 1976. BEL. 0844831.
3,998,450.—IMPROVED SORTING APPARATUS. DEC. 21, 1976. GRB. 1433088.
4,004,549.—ROLL FUSER. JAN. 25, 1977.
4,006,985.—XEROGRAPHIC APPARATUS HAVING TIME CONTROLLED FUSING. FEB. 8, 1977.
4,032,746.—CONTROL SYSTEM FOR A FUSING APPARATUS. JUNE 28, 1977.
4,035,140.—FIXING DEVICE IN AN ELECTROPHOTOGRAPHIC COPYING MACHINE. JULY 12, 1977.

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RE.28,802.—FUSING APPARATUS. MAY 4, 1976. CAN. 0990779, FRA. 7338110, GRB. 1436563.
2,586,484.—FUSING DEVICE. FEB. 19, 1952.
2,965,868.—RESISTANCE TYPE HEATING ELEMENTS. DEC. 20, 1960. CAN. 0643795, GER. 1810418, GRB. 0948916, JAP. 0319003.
3,079,483.—XEROGRAPHIC FIXING APPARATUS. FEB. 26, 1963. ARG. 0155449, CAN. 0682500, GRB. 1032955, IND. 0096312.
3,083,623.—TRANSFERRED IMAGE APPARATUS. APR. 2, 1963. CAN. 0701631.
3,219,326.—XEROGRAPHIC FUSING APPARATUS. NOV. 23, 1965. CAN. 0716212.
3,374,769.—TONER FUSING APPARATUS. MAR. 26, 1968. CAN. 0819836, FRA. 1396610, GER. 1522709, GRB. 1152067, JAP. 0534764.
3,396,401.—APPARATUS AND METHOD FOR MARKING OF INTELLIGENCE ON A RECORD MEDIUM. AUG. 6, 1968.
3,409,280.—POROUS DRUM FUSER. NOV. 5, 1968.
3,411,932.—QUALITY XEROGRAPHIC REPRODUCTIONS. NOV. 19, 1968. CAN. 0788948, FRA. 1459094, GER. 1497213, GRB. 1112000, ITL. 0725763, MEX. 0078900.
3,498,592.—HEAT FIXING APPARATUS FOR FUSIBLE MATERIAL. MAR. 3, 1970. ARG. 0180584, AUS. 0432632, BEL. 0733403, CAN. 0878082, CZC. 0164830, FRA. 6917080, GRB. 1269716, ITL. 0864984, MEX. 0111516, PNM. 0001417, SPN. 0367614, STZ. 0506821, SWD. 0345328, TIW. 0006603, USR. 0340215.
3,519,253.—SELECTIVE XEROGRAPHIC FUSER. JULY 7, 1970. ARG. 0168753, ATR. 0293871, AUS. 0416089, BEL. 0704925, CAN. 0843377, CHL. 0023289, CLB. 0017682, DNK. 0123893, FRA. 1540701, GRB. 1193355, GUA. 0002145, HUN. 0157550, ITL. 0830722, JAM. 0001850, MEX. 0107890, PRU. 0009344, SAF. 0676018, SPN. 0345919, STZ. 0470698, SWD. 0322690, TRD. 0000113, URG. 0008846, USR. 0372852, VZL. 0026101.
3,535,492.—FUSING APPARATUS. OCT. 20, 1970. ARG. 0181204, BEL. 0733663, CAN. 0872978, FRA. 6917190, GRB. 1266932, HOL. 149013, ITL. 0865914, MEX. 0110755.
3,623,710.—FIXING ARRANGEMENT. NOV. 30, 1971.
3,648,991.—METHOD AND APPARATUS FOR SELECTIVE FUSING. MAR. 14, 1972.
3,667,742.—FIXING ARRANGEMENT. JUNE 6, 1972. BEL. 0777318, CAN. 0928766, FRA. 7147890, GRB. 1368307, ITL. 0944393.
3,765,828.—FUSING APPARATUS. OCT. 16, 1973. CAN. 0991256, GRB. 1428800.
3,770,346.—METHOD AND APPARATUS FOR FUSER ASSEMBLY COOLING IN AN ELECTROSTATOGRAPHIC MACHINE. NOV. 6, 1973. CAN. 1002582, GRB. 1421863.
3,781,517.—FUSER THERMAL PROTECTOR. DEC. 25, 1973. GRB. 1441702.
3,792,227.—FUSER APPARATUS. FEB. 12, 1974.
3,819,259.—LIGHT ATTENUATOR. JUNE 25, 1974. GRB. 1428799.
3,826,892.—FUSING APPARATUS. JULY 30, 1974. CAN. 0990779, FRA. 7338110, GRB. 1436563.
3,849,905.—FUSING APPARATUS. NOV. 26, 1974.
3,849,907.—FUSING APPARATUS. NOV. 26, 1974.
3,869,696.—FUSER APPARATUS. MAR. 4, 1975.
3,874,892.—ELECTROSTATOGRAPHIC FUSING PROCESS EMPLOYING REPLACEABLE LINER. APR. 1, 1975. CAN. 0980405, GRB. 1374652.
3,898,424.—RADIANT FUSER XEROGRAPHIC REPRODUCING APPARATUS. AUG. 5, 1975.

3,907,492.—FUSING APPARATUS. SEPT. 23, 1975. CAN. 0990779, GRB. 1436563.
3,939,326.—DUAL RIBBON FUSER. FEB. 17, 1976.
3,944,784.—DUAL RIBBON FUSER. MAR. 16, 1976.
3,953,709.—TWO SOURCE RADIANT FUSER FOR XEROGRAPHIC REPRODUCING APPARATUS. APR. 27, 1976.
3,987,757.—PAPER HANDLING IMPROVEMENTS IN RADIANT FUSER VIA CORRUGATION OF PAPER. OCT. 26, 1976.
4,001,622.—DIRECTIONAL SOURCES OF ELECTROMAGNETIC RADIATION. JAN. 4, 1977. GRB. 1443340.
4,015,103.—A FUSER CONVEYOR BELT. MAR. 29, 1977.
4,021,641.—RADIANT FUSER FOR FIXING TONER IMAGES. MAY 3, 1977.

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3,445,626.—FUSING APPARATUS WITH FLASH LAMP CIRCUIT. MAY 20, 1969. CAN. 0843525, GRB. 1180604, JAP. 1075585.
3,465,203.—FLASH LAMP FOR ELECTROSCOPIC TONER. SEPT. 2, 1969. CAN. 0843526, GER. 1589315, GRB. 1185687, JAP. 0758339.
3,474,223.—SELECTIVE FLASH FUSING. OCT. 21, 1969. CAN. 0851811, FRA. 1546257, GRB. 1208770, JAP. 0558445.
3,529,129.—REFLECTION TYPE FLASH FUSER. SEPT. 15, 1970. ARG. 0180678, BEL. 0728716, CAN. 0855311, FRA. 6004567, GRB. 1252465, ITL. 0866971, JAP. 0661180, MEX. 0107835.
3,566,076.—TONER FIXING APPARATUS. FEB. 23, 1971. CAN. 0913164, GRB. 1256471.
3,655,280.—XEROGRAPHIC FUSING METHOD AND APPARATUS. APR. 11, 1972.
3,765,828.—FUSING APPARATUS. OCT. 16, 1973. CAN. 0991256, GRB. 1428800.
3,792,227.—FUSER APPARATUS. FEB. 12, 1974.
3,819,259.—LIGHT ATTENUATOR. JUNE 25, 1974. GRB. 1428799.
3,865,081.—MAGNETIC BRUSH DEVELOPING APPARATUS. FEB. 11, 1975.
3,869,696.—FUSER APPARATUS. MAR. 4, 1975.
3,903,394.—READ/WRITE APPARATUS FOR MAGNETIC RECORDERS. SEPT. 2, 1975.
3,920,952.—DUPLEX FUSING APPARATUS AND METHOD. NOV. 18, 1975.
3,935,424.—FLASH FUSING APPARATUS. JAN. 27, 1976.
3,944,783.—HIGH EFFICIENCY NON CAVITY RADIANT METHOD AND APPARATUS. MAR. 16, 1976.
3,980,424.—FUSER CLEANING ROLLER. SEPT. 14, 1976.
4,001,541.—FLASH FUSING SYSTEM WITH ENERGY CONTROL. JAN. 4, 1977.
4,027,199.—FLASH LAMP MODULATOR SYSTEM. MAY 31, 1977.

Class 8A 1B

2,852,651.—FUSING MECHANISM FOR A XEROGRAPHIC COPYING MACHINE. SEPT. 16, 1958. CAN. 0619281.
3,053,962.—XEROGRAPHIC FUSING APPARATUS. SEPT. 11, 1962. CAN. 0657396, GER. 1165413, GRB. 0999763.
3,357,401.—XEROGRAPHIC FUSER MONITORING APPARATUS. DEC. 12, 1967.
3,432,639.—FUSING APPARATUS. MAR. 11, 1969. CAN. 0851810, GRB. 1194234, JAP. 0608702.
3,437,407.—XEROGRAPHIC FUSING SYSTEM. APR. 8, 1969. CAN. 0842370, JAP. 0758338.
3,445,626.—FUSING APPARATUS WITH FLASH LAMP CIRCUIT. MAY 20, 1969. CAN. 0843525, GRB. 1180604, JAP. 1075585.
3,449,546.—INFRA-RED HEATER. JUNE 10, 1969. ARG. 0170237, ATR. 0303518, AUS. 0402657, BEL. 0700101, BRA. 6788714, CAN. 0852819, CHL. 0023085, DNK. 0118703, FRA. 1527629, GRB. 1187481, ITL. 0805313, MEX. 0101251, NOR. 0123480, PLD. 0068551, PRU. 0009320, SAF. 0673601, SPN. 0341906, STZ. 0499143, SWD. 0332936, URG. 0008615, VZL. 0026103.
3,507,333.—FIRE PREVENTION SYSTEM. APR. 21, 1970. BEL. 0722599, CAN. 0910255, FRA. 1589864, GRB. 1229495, ITL. 0845253, JAP. 0752504.
3,558,853.—FUSER SYSTEM FOR COPYING MACHINE. JAN. 26, 1971. ARG. 0186145, ATR. 0309984, AUS. 0446113, BEL. 0750389, BRA. 7019023, CAN. 0874013, CZC. 0168526, EGR. 0083065, FRA. 7017316, GRB. 1309129, ITL. 0893097, JAP. 0836943, MEX. 0117915, NZL. 0160101, SPN. 0379651, STZ. 0506817, SWD. 0357840, TIW. 0006834, VZL. 0032597.
3,588,445.—FUSER CONTROL CIRCUIT. JUNE 28, 1971.
3,735,092.—FUSER CONTROL CIRCUIT FOR COPYING APPARATUS. MAY 22, 1973. CAN. 0991254, GRB. 1406655.
3,781,516.—FUSER CONTROL SYSTEM. DEC. 25, 1973. MEX. 0135422.
3,790,747.—REGULATOR FOR XEROGRAPHIC FUSING APPARATUS. FEB. 5, 1974. ARG. 0200245, AUS. 0467385, BEL. 0789339, CAN. 0991252, FRA. 7234199, GRB. 1397586, ITL. 0972690, MEX. 0129168, SPN. 0409974, STZ. 0554008, SWD. 7215167, VZL. 0032607.
3,833,794.—FIXING UNIT FOR USE IN A DUPLICATING APPARATUS. SEPT. 3, 1974.
3,851,144.—FEEDBACK FUSER FOR 730S. NOV. 26, 1974.
3,989,370.—ADAPTIVE FUSER CONTROLLER. NOV. 2, 1976.
3,989,926.—DEVICE FOR PREVENTING OVERHEATING OF ELECTROPHOTOGRAPHIC FIXING DEVICE. NOV. 2, 1976.
4,032,746.—CONTROL SYSTEM FOR A FUSING APPARATUS. JUNE 28, 1977.

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3,076,083.—XEROGRAPHIC FIXING APPARATUS. JAN. 29, 1963.

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2,701,765.—XEROGRAPHIC FUSING APPARATUS. FEB. 8, 1955. CAN. 0530525.
3,349,702.—FUSER HAVING HEATED AND UNHEATED PORTIONS FOR PRINT FIXING PURPOSES. OCT. 31, 1967. CAN. 0833789, MEX. 0096468.
3,356,831.—XEROGRAPHIC FUSING APPARATUS. DEC. 5, 1967. CAN. 0798466, FRA. 1465786, GER. 1497228, GRB. 1117339, ITL. 0749552, JAP. 0512652.
3,584,195.—HEAT FIXING APPARATUS. JUNE 8, 1971. GRB. 1322354.
3,718,390.—MICROFICHE INDEXER. FEB. 27, 1973. ARG. 0190620, BEL. 0768712, CAN. 0946659, GRB. 1350656, ITL. 0927453, MEX. 0121626, SWD. 7107727.
3,788,873.—FIXING METHOD UTILIZING INTERMEDIATE HEAT TRANSFER. JAN. 29, 1974.
3,810,735.—HEAT FIXING APPARATUS FOR FUSIBLE MATERIAL. MAY 14, 1974.
3,849,628.—NON-CONTACT TEMPERATURE SENSOR FOR ROLL FUSER OF A XEROGRAPHIC REPRODUCTION APPARATUS. NOV. 19, 1974. CAN. 1002583, GRB. 1322612.
3,881,859.—STRIPPER FINGER DESIGN TO PREVENT OIL-ON-THE-COPY. MAY 6, 1975.
3,900,590.—XEROGRAPHIC FUSING APPARATUS. AUG. 19, 1975. CAN. 0992614, GRB. 1192444.
3,904,354.—RESILIENT STRIPPER MEMBERS FORMING A PART OF A FUSER ROLL. SEPT. 9, 1975.
3,937,637.—ROLL CONTACT FUSER. FEB. 10, 1976.
3,940,235.—IMMERSIONS FUSING. FEB. 24, 1976.
3,965,855.—IMMERSION FUSING. JUNE 29, 1976.
3,976,814.—FUSING DEVICE & METHOD. AUG. 24, 1976.
3,997,691.—FUSING SURFACE AND METHOD FOR FIXING TONER. DEC. 14, 1976.
4,000,339.—FUSING SURFACE & METHOD FOR FIXING XEROGRAPHIC TONER. DEC. 28, 1976.
4,015,103.—A FUSER CONVEYOR BELT. MAR. 29, 1977.
4,029,827.—MERCAPTO FUNCTIONAL POLYORGANOSILOKANE RELEASE AGENTS FOR FUSERS IN ELECTROSTATIC COPIERS. JUNE 14, 1977. SPN. 0439743.

Class 8A 2A

3,256,002.—XEROGRAPHIC FIXING DEVICE. JUNE 14, 1966. ADN. 0000470, AUS. 0295646, BRS. 00J3738, BRU. 0000569, CAN. 0796441, FIJ. 0000343, GHA. 0000995, GIB. 1089537, GIE. 0006669, GRB. 1089537, GUR. 1089537, HGK. 0009269, ISR. 0030229, JAP. 0537119, JER. 0000P98, KEN. 0001745, MAU. 1917571, MLS. 0015169, NIG. 0001618, NZL. 0148733, SBH. 0005369, SGP. 0008369, SHL. 0000018, SLN. 3677286, SRK. 0000386, STZ. 0458077, UGD. 0000369.
3,268,351.—XEROGRAPHIC FIXING METHOD AND APPARATUS. AUG. 23, 1966. JAP. 0489660.
3,291,466.—XEROGRAPHIC FIXING DEVICE. DEC. 13, 1966. CAN. 0800935, FRA. 1458647, GRB. 1122628, ITL. 0729649, JAP. 0524526, MEX. 0090836.
3,324,791.—XEROGRAPHIC ROLLER FUSER DRIVE APPARATUS. JUNE 13, 1967. CAN. 0825903, GRB. 1135744, JAP. 0512655, STZ. 0520889.
3,327,096.—TEMPERATURE CONTROL CIRCUIT. JUNE 20, 1967. CAN. 0797970, FRA. 1448641, GRB. 1113451, ITL. 0729649, JAP. 0572184, MEX. 0085994.

3,331,592.—XEROGRAPHIC FUSING APPARATUS. JULY 18, 1967. CAN. 0823589, JAP. 0512657, MEX. 0108575.
3,357,249.—TEMPERATURE SENSOR. DEC. 12, 1967. CAN. 0810332, GER. 1690654, GRB. 1171381.
3,435,500.—PRESSURE ROLL AND METHOD OF MANUFACTURING. APR. 1, 1969. ARG. 0153406, AUS. 0408490, BEL. 0670480, BRA. 0083780, CAN. 0832922, FRA. 1450156, GER. 1546792, GRB. 1124036, ITL. 0730679, JAP. 0669366, MEX. 0107366, VZL. 0024008.
3,437,032.—HEATED FUSER ROLL. APR. 8, 1969. ARG. 0155221, AUS. 0043081, BEL. 0683308, CAN. 0800936, FRA. 1484969, GRB. 1137227, ITL. 0773369, JAP. 1071499, MEX. 0093105, SPN. 0328427, STZ. 0467476, SWD. 0321410, VZL. 0023990.
3,449,548.—FUSING DEVICE. JUNE 10, 1969.
3,498,596.—HEAT FIXING APPARATUS FOR FUSIBLE MATERIAL. MAR. 3, 1970. ARG. 0181805, AUS. 0428652, BEL. 0733408, BRA. 6909134, CAN. 0860450, CZC. 0150764, FRA. 6917085, GRB. 1258152, ITL. 0865073, MEX. 0111517, PLD. 0079991, PNM. 0002166, SPN. 0367312, STZ. 0505411, SWD. 0345529, TIW. 0006194, USR. 0230669, VZL. 0025073.
3,539,161.—HEAT FIXING APPARATUS FOR FUSIBLE MATERIALS. NOV. 10, 1970. CAN. 0889987.
3,612,820.—HEAT FIXING APPARATUS FOR LENGTHY FUSIBLE MATERIALS. OCT. 12, 1971.
3,649,992.—CLEANING APPARATUS FOR FUSING SYSTEM. MAR. 21, 1972. CAN. 0980517, GRB. 1340684.
3,667,742.—FIXING ARRANGEMENT. JUNE 6, 1972. BEL. 0777318, CAN. 0928766, FRA. 7147890, GRB. 1368307, ITL. 0944393.
3,690,176.—TEMPERATURE SENSING APPARATUS. SEPT. 12, 1972. GRB. 1383087.
3,718,116.—OIL DISPENSING APPARATUS. FEB. 27, 1973. CAN. 0984895.
3,745,972.—WICKING APPARATUS. JULY 17, 1973. CAN. 0991251, GRB. 1397626.
3,751,216.—FUSER ROLL ASSEMBLY. AUG. 7, 1973.
3,754,819.—APPARATUS FOR PLACING ROLLERS IN CONTACT IN A PRESSURE FUSER ASSEMBLY. AUG. 28, 1973.
3,776,760.—METHOD FOR MANUFACTURING A TETRAFLUOPOETHLENE POLYMER-COATED ROLL. DEC. 4, 1973. ARG. 0199302, ATR. 0335842, AUS. 0165141, BEL. 0789728, CAN. 0990149, GRB. 1410025, NZL. 0168554, SAF. 0727133, STZ. 0028514.
3,796,183.—FREE FLOATING PRESSURE BIASING APPARATUS FOR CLEANING ROLL FUSER. MAR. 12, 1974.
3,799,401.—SILICONE OIL CAPACITY CONTROL USING POLYURETHANE BELT. MAR. 26, 1974.
3,820,591.—APPARATUS FOR SENSING DIMENSION OF SHEETS OF MATERL TO BE TRNPRTD THROUGH ELCTRSTIC REPRDCTN M. JUNE 28, 1974. CAN. 1004290.
3,831,553.—WICK FOR OIL DISPENSING APPARATUS. AUG. 27, 1974. CAN. 0984895.
3,852,861.—SURFACES WITH FLUOROCARBON PROCESS FOR MULTIPLE COATING RESINS. DEC. 10, 1974. ARG. 0199302, ATR. 0335842, AUS. 0165141, BEL. 0789728, CAN. 0990149, GRB. 1410025, NZL. 0168554, SAF. 0727133, STZ. 0028514.
3,861,860.—DRY FUSER ROLL CLEANING APPARATUS. JAN. 21, 1975.
3,881,085.—FUSER CONTROL CIRCUIT FOR COPYING APPARATUS. APR. 29, 1975. BEL. 0808310, GRB. 1447679.
3,883,291.—OIL APPLICATOR FOR REPRODUCTION MACHINE FUSER. MAY 13, 1975. BEL. 0822048, FRA. 7438048, SPN. 0432090.
3,883,292.—SLEEVELESS PRESSURE ROLL CLEANER. MAY 13, 1975.
3,883,293.—PRESSURE ROLL CONSTRUCTION. MAY 13, 1975.
3,902,845.—METAL FOAM UNDER CONFORMABLE SURFACE REPLACEABLE. SEPT. 2, 1975.
3,906,800.—REUSABLE NIP MEASURING DEVICE AND METHOD. SEPT. 23, 1975.
3,907,493.—VISCO-ELASTIC DAMPENER MECHANISM FOR FUSER ASSEMBLY. SEPT. 23, 1975.
3,908,589.—STRUCTURE FOR APPLYING RELEASE AGENT TO A HEATED FUSER ROLL STRUCTURE. SEPT. 30, 1975.
3,912,901.—PFA TEFLON SLEEVED CHOW PRESSURE ROLL. OCT. 14, 1975.
3,913,521.—COMPOSITE DOCTORING BLADE FOR A HEATED FUSER ROLL UTILIZED FOR FIXING TONER. OCT. 21, 1975.
3,918,397.—CONTACT FUSING APP FOR FIXING TONER IMAGES TO A SUPPORT MEMBER. NOV. 11, 1975.
3,918,804.—APP FOR APPLYING RELEASE MATERIAL TO A CONTACT FUSER ROLL MEMBER UTILIZED IN FIXNG TNR IMGS TO. NOV. 11, 1975.
3,921,573.—CLEANING SYSTEM FOR ELECTROSTATIC REPRODUCING APPARATUS. NOV. 25, 1975.
3,924,564.—FUSER APPARATUS HAVING AN ARTICULATED RELEASE MATERIAL DISPENSER. DEC. 9, 1975.
3,926,058.—CONTACT ARC REPLICATION DEVICE. DEC. 16, 1975.
3,929,094.—ROLL FUSER. DEC. 30, 1975.
3,929,095.—ROLL FUSER. DEC. 30, 1975.
3,929,096.—ROLL FUSER. DEC. 30, 1975.
3,934,113.—ROLL FUSER APPARATUS AND MOUNTING ARRANGEMENT THEREFOR. JAN. 20, 1976.
3,934,547.—RENEWABLE CHOW FUSER COATING. JAN. 27, 1976.
3,935,836.—METERING BLADE FOR A FUSER ROLL. FEB. 3, 1976.
3,938,950.—STRIPPING APPARATUS. FEB. 17, 1976.
3,940,238.—CLEANING STRUCTURE FOR AN ELASTOMERIC FUSER MEMBER. FEB. 24, 1976.
3,940,518.—BAKE TECHNIQUE FOR MANUFACTURING TETRAFLUOROETHYLENE COATED ROLLS. FEB. 24, 1976. GRB. 1452718.
3,941,558.—A CONTACT AND HEATING FIXING DEVICE FOR ELECTROPHOTOGRAPHY. MAR. 2, 1976.
3,942,887.—DRIVE MECHANISM FOR A ROLL FUSER EMPLOYED IN A COPIER APPARATUS. MAR. 9, 1976.
3,948,214.—INSTANT START FUSING APPARATUS. APR. 6, 1976.
3,951,538.—A PERMANENTLY NIPPED CONTACT IMAGE FUSER SYSTEM INCORPORATING A ONE-WAY CLUTCH. APR. 20, 1976.
3,955,916.—FUSER ROLL SHEET STRIPPING APPARATUS. MAY 11, 1976.
3,965,331.—DUAL MODE ROLL FUSER. JUNE 22, 1976.
3,965,332.—SELECTIVE FUSING APPARATUS. JUNE 22, 1976.
3,965,853.—CONTACT FUSER ASSEMBLY. JUNE 29, 1976.
3,965,973.—TEMPERATURE SENSING DEVICE. JUNE 29, 1976.
3,966,394.—PLURAL CLEANING ROLLS ASSEMBLY. JUNE 29, 1976.
3,968,343.—FUSER ROLL TEMPERATURE REGULATOR PROBE. JULY 6, 1976.
3,970,038.—ROLL FUSER. JULY 20, 1976.
3,973,844.—LATCHING MECHANISM FOR THE BACK-UP ROLL OF A ROLL FUSER EMPLOYED IN A COPIER APPARATUS. AUG. 10, 1976.
3,976,370.—BELT TRANSFER AND FUSING SYSTEM. AUG. 24, 1976.
3,980,423.—FUSER CLEANING ROLLER ASSEMBLY. SEPT. 14, 1976.
3,981,085.—AIR STRIPPING DEVICE FOR ELASTOMERIC SURFACE. SEPT. 21, 1976.
3,989,005.—IMPROVED OIL METERING BLADE DEVICE. NOV. 2, 1976.
3,993,124.—METH&APPRTS FOR SUSR ASSMBLY CLING IN ELCTROSTATOGRPC MACHNE-GAMMA METH&APPRTS FOR FUSER END CO. NOV. 23, 1976. BEL. 0793560, FRA. 7246728, ITL. 0973322, SWD. 7216976.
3,996,886.—IMPROVED OIL METERING BLADE HOLDER ASSEMBLY. DEC. 14, 1976.
3,996,887.—IMPROVED OIL METERING BLADE HOLDING DEVICE. DEC. 14, 1976.
3,999,510.—HIGH SURFACE ENERGY CLEANING ROLL. DEC. 28, 1976.
4,000,394.—FUSER THERMAL DETECTOR. DEC. 28, 1976.
4,000,957.—CONTACT FUSER AND RELEASE AGENT APPLICATOR THEREFOR. JAN. 4, 1977.
4,000,963.—CLEANING APPARATUS FOR A HEAT & PRESSURE FUSER. JAN. 4, 1977.
4,004,549.—ROLL FUSER. JAN. 25, 1977.
4,008,955.—FUSER ASSEMBLY FOR AN ELECTROPHOTOGRAPHIC COPYING MACHINE. FEB. 22, 1977.
4,011,831.—IMPROVED OIL METERING BLADE LOADING ASSEMBLY. MAR. 15, 1977.
4,013,400.—CLEANING APPARATUS FOR A HEAT & PRESSURE FUSER. MAR. 22, 1977.
4,018,555.—CLEANING APPARATUS FOR ROLL FUSER. APR. 19, 1977.
4,025,751.—FUSER ROLL SLEEVE. MAY 24, 1977.
4,026,238.—APP FOR APPLYING RELEASE MATERIAL TO A CONTACT FUSER ROLL MEMBER UTILIZED IN FIXING TONER IMAGE. MAY 31, 1977.
4,028,050—STRIPPER FINGER COMBINATION MOUNTING MEANS THEREFOR. JUNE 7, 1977.
4,034,188.—HEAT FIXING DEVICE FOR COPYING MACHINE. JULY 5, 1977.

4,034,706.—DUAL RELEASE AGENT CU-VITON FUSER. JULY 12, 1977.

Class 8A 3

3,180,971.—XEROGRAPHIC FUSING APPARATUS. APR. 27, 1965. CAN. 0734734, GRB. 1027904, JAP. 0524355.
3,219,799.—XEROGRAPHIC FUSING APPARATUS. NOV. 23, 1965.
3,604,892.—FUSING APPARATUS. SEPT. 14, 1971.
3,856,460.—DEVELOPING SYSTEM FOR FILM BY ADIABACTIC HEAT FLOW. DEC. 24, 1974.

Class 8A 4

3,093,039.—APPARATUS FOR TRANSFERRING POWDER IMAGES AND METHOD THEREFOR. JUNE 11, 1963. CAN. 0744873.

Class 8B

2,684,301.—DEVICE FOR FUSING XEROGRAPHIC IMAGES. JULY 20, 1954.
2,776,907.—METHOD OF FIXING ELECTROSTATIC POWDER IMAGE. JAN. 8, 1957. CAN. 0574197.
2,922,230.—XEROGRAPHIC POWDER FIXING APPARATUS. JAN. 26, 1960.
2,995,464.—METHOD AND APPARATUS FOR FIXING XEROGRAPHIC POWDER IMAGES. AUG. 8, 1961. CAN. 0705852, FRA. 1243780, GER. 1106780, GRB. 0890911.
3,013,342.—XEROGRAPHIC FIXING APPARATUS. DEC. 19, 1961. CAN. 0616923.
3,049,810.—XEROGRAPHIC FUSING APPARATUS. AUG. 21, 1962. CAN. 0740393.
3,117,847.—XEROGRAPHIC POWDER IMAGE FIXING APPARATUS. JAN. 14, 1964.
3,132,047.—XEROGRAPHIC FIXING APPARATUS. MAY 5, 1964. AUS. 0266991, CAN. 0713996, FRA. 1332228, GER. 1571130, GRB. 1012444, JAP. 0835352.
3,148,078.—XEROGRAPHIC FUSING METHOD. SEPT. 8, 1964.
3,149,931.—XEROGRAPHIC VAPOR FUSING APPARATUS. SEPT. 22, 1964. CAN. 0758518.
3,158,509.—XEROGRAPHIC FIXING APPARATUS. NOV. 24, 1964. CAN. 0762382, GRB. 1023052, JAP. 0456309.
3,215,116.—VAPOR FUSING APPARATUS. NOV. 2, 1965.
3,704,524.—APPARATUS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES. DEC. 5, 1972. ARG. 0188616, BEL. 0779806, CAN. 0950655, FRA. 7208101, GRB. 1385328, MEX. 0126261.
3,884,690.—POLYESTER PHOTOCONDUCTORS AND MATRIX MATERIALS. MAY 20, 1975.
3,884,825.—IMAGING COMPOSITION. MAY 20, 1975. AUS. 0467835, BEL. 0802879, CAN. 0995963, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 0417382.
3,934,546.—APPARATUS FOR FIXING WITH SOLVENT VAPORS. JAN. 27, 1976.
3,940,518.—BAKE TECHNIQUE FOR MANUFACTURING TETRAFLUOROETHYLENE COATED ROLLS. FEB. 24, 1976. GRB. 1452718.

Class 8B 1

3,070,900.—XEROGRAPHIC FIXING APPARATUS. JAN. 1, 1963. CAN. 0686166.
3,078,589.—XEROGRAPHIC FUSING APPARATUS. FEB. 26, 1963. CAN. 0609621, GRB. 0859788.
3,140,159.—XEROGRAPHIC FUSING AND DRYING APPARATUS. JULY 7, 1964.
3,140,160.—XEROGRAPHIC FUSING AND DRYING APPARATUS. JULY 7, 1964.
3,199,223.—XEROGRAPHIC FUSING AND DRYING APPARATUS. AUG. 10, 1965.
3,288,624.—VAPOR FUSING METHOD FOR XEROGRAPHIC POWDER IMAGES. NOV. 29, 1966.

Class 8C

2,894,840.—METHOD FOR FIXING XEROGRAPHIC IMAGES. JULY 14, 1959.
2,995,085.—TRANSFER AND FIXING METHOD. AUG. 8, 1961. CAN. 0622688.
3,158,509.—XEROGRAPHIC FIXING APPARATUS. NOV. 24, 1964. CAN. 0762382, GRB. 1023052, JAP. 0456309.
3,386,822.—SOLVENT CAPSULE FIXING OF POWDER IMAGES. JUNE 4, 1968. CAN. 0712993, FRA. 1430471, GER. 1497196, GRB. 1087201, HOL. 0132775, ITL. 0745341, JAP. 0741995.
3,893,760.—TRANSFER APPARATUS. JULY 8, 1975.
3,926,824.—ELECTROSTATOGRAPHIC DEVELOPER COMPOSITION. DEC. 16, 1975. ARG. 0192480, AUS. 0466319, BEL. 0793098, CAN. 0985552, FRA. 7245403, GRB. 1417179, ITL. 0973327, SPN. 0410171, STZ. 0028663, SWD. 7216977.
3,940,235.—IMMERSIONS FUSING. FEB. 24, 1976.
3,965,855.—IMMERSION FUSING. JUNE 29, 1976.

Class 8D

2,894,840.—METHOD FOR FIXING XEROGRAPHIC IMAGES. JULY 14, 1959.
3,493,412.—TRANSFERRING XEROGRAPHIC TONER IMAGES TO A SOLID CRYSTALLINE PLASTICIZER COATED RECEIVING SURFA. FEB. 3, 1970. CAN. 0880837, MEX. 0096609.
3,640,746.—ADHESIVE CONTACT ELECTRIFICATION IMAGING. FEB. 8, 1972.
3,861,911.—IMAGING FIXING METHOD. JAN. 21, 1975.

Class 8E

2,681,473.—MANUFACTURE OF PLAQUES AND THE LIKE. JUNE 22, 1954.
2,855,324.—CONTACT TRANSFER FOR XEROGRAPHY. OCT. 7, 1958. CAN. 0665467, FRA. 1170805, GER. 1036279, GRB. 0843502.
2,886,464.—CONTACT TRANSFER FOR XEROGRAPHY. MAY 12, 1959.
3,157,546.—IMAGE TRANSFER. NOV. 17, 1964. ATR. 0225034, BEL. 0602721, FRA. 1287124, GER. 1271547, GRB. 0985176, ITL. 0647042, JAP. 0414127, STZ. 0383417.
3,591,276.—METHOD AND APPARATUS FOR OFFSET XEROGRAPHIC REPRODUCTION. JULY 6, 1971. CAN. 0894931, GER. 1811893, GRB. 1245426, JAP. 0648075.
3,799,827.—PROCESS FOR PROTECTING THE SURFACE OF AN IMAGE. MAR. 26, 1974.
3,816,066.—XEROGRAPHIC FIXING DEVICE. JUNE 11, 1974.
3,861,219.—METHOD FOR MEASURING HEAT AND PRESSURE CHARACTERISTICS OF FUSING APP. JAN. 21, 1975. CAN. 1013807.
3,888,622.—TEMPERATURE SENSING DEVICE. JUNE 10, 1975.
3,928,656.—METHOD OF DEVELOPING ELECTROSTATIC LATENT IMAGES WITH PRESSURE SENSITIVE TONER. DEC. 23, 1975. ARG. 0196320, AUS. 0464392, BEL. 0793554, CAN. 1011149, FRA. 7246575, GRB. 1417409, ITL. 0973325, SPN. 0410211, STZ. 0028568.
3,934,477.—TEMPERATURE SENSING DEVICE. JAN. 27, 1976.
3,936,658.—FUSER APPARATUS FOR ELECTROSTATIC REPRODUCING MACHINES. FEB. 3, 1976. BEL. 0844831.

Class 8E 1

2,843,499.—PRESSURE TRANSFER OF XEROGRAPHIC IMAGES. JULY 15, 1958.
2,995,085.—TRANSFER AND FIXING METHOD. AUG. 8, 1961. CAN. 0622688.
3,003,891.—UNMOTTLED DYE TRANSFER. OCT. 10, 1961.
3,060,052.—TRANSFER OF XEROGRAPHIC DYE IMAGES. OCT. 23, 1962. AUS. 0242307, CAN. 0678380, FRA. 1246634, GRB. 0946761.

Class 9

3,836,244.—COLOR XEROGRAPHY. SEPT. 17, 1974.
3,958,878.—ELECTROSTATIC PROCESSOR HOUSING INTERCHANGABLE RESERVOIRS FOR SUPPING AND RECLAIMING TONER. MAY 25, 1976.
3,980,494.—METHOD OF REDUCING FRICTION IN BLADE CLEANING OF IMAGING SURFACES. SEPT. 14, 1976.
3,983,841.—TONER RECLAIM CONVEYOR. OCT. 5, 1976.

Class 9A

T.940,022.—PRESSURIZED AND FILTERED XEROGRAPHIC SYSTEM. NOV. 4, 1975.
3,552,850.—LUBRICATED BLADE CLEANING OF IMAGING PHOTOCONDUCTIVE MEMBERS. JAN. 5, 1971. ALB. 0003931, ARG. 0172544, ATR. 0300568, AUS. 0438884, BEL. 0727561, BRA. 6898275, BUR. 0000041, CAM. 0000453, CAN. 0869669, CHL. 0024409, CLB. 0017926, COR. 000947A, DNK. 0122738, EGR. 0075946, EIR. 0032784, FRA. 6902175, GNR. 0000043, GRB. 1259513, GRK. 0039239, IND. 0119582, ISR. 0031502, ITL. 0854622, LIB. P272693, LXB. 0057856, MEX.

0106799, MLG. 0003059, MLW. 00MW769, MNC. 8146975, MRC. 0014725, NOR. 0128683, NZL. 0155207, PAK. 0120897, PLD. 0017650, PLP. 0006639, PNM. 0001979, PRU. 0009588, PTG. 0051062, RHD. 5569489, SAF. 6970696, SPN. 0363130, STZ. 0493016, SWD. 0346398, TGR. 0000550, URG. 0009736, USR. 0385466, VTM. 0001840, VZL. 0023692, ZMB. 0176973.

3,635,704.—IMAGING SYSTEM. JAN. 18, 1972. ALB. 0004133, ARG. 0176978, ATR. 0303521, AUS. 0440759, BEL. 0727560, BRA. 0088093, BUR. 0000042, CAM. 0000463, CAN. 0867697, CHL. 0026254, COR. 000949A, DNK. 0131403, EGR. 0078899, EIR. 0032632, FRA. 6902174, GNR. 0000042, GRB. 1259514, GRK. 0039240, IND. 0119583, ISR. 0031503, ITL. 0871510, LAS. 0000199, LIB. 00P7269, LXB. 0057849, MEX. 0106332, MLG. 0003056, MLW. 00MW869, MNC. 8156975, MRC. 0014724, NZL. 0155208, PAK. 0120859, PLP. 0008511, PNM. 0001676, PRU. 0010443, PTG. 0051063, RHD. 4169529, RMN. 0055464, SAF. 0069995, SPN. 0363127, STZ. 0513431, SWD. 0342921, SYA. 0002477, TGR. 0000551, TIW. 0005257, UAR. 0009525, USR. 0396887, VTM. 0001805, VZL. 0023744, ZMB. 0186974.

3,717,409.—CLEANING OF ELECTROSTATOGRAPHIC SURFACES. FEB. 20, 1973.

3,724,019.—WIPER BLADE CLEANING APPARATUS FOR XEROGRAPHIC MACHINES. APR. 3, 1973. CAN. 991248.

3,724,020.—WIPER BLADE CLEANER FOR XEROGRAPHIC MACHINES. APR. 3, 1973. ARG. 0194951, BEL. 0783490, CAN. 0991249, FRA. 7216778, GER. 2220821, GRB. 1399156, ITL. 0955404, MEX. 0127875.

3,838,472.—TONER CLEANING APPARATUS. OCT. 1, 1974. BEL. 0789325, CAN. 0991694, FRA. 7233424, GER. 2239441, GRB. 1403439, ITL. 0967797, SWD. 7212456.

3,847,480.—CONTINOUS BLADE CLEANER. NOV. 12, 1974.

3,848,992.—DEVELOPER BLADE CLEANING. NOV. 19, 1974. FRA. 7415394, GRB. 1443128, ITL. 0010212.

3,848,993.—SUPPORTED DEVELOPER BLADE CLEANING. NOV. 19, 1974.

3,848,994.—LINE CHARGE TONER CLEANING. NOV. 19, 1974.

3,854,814.—TRANSLATING DWELL CLEANING SYSTEM. DEC. 17, 1974.

3,871,762.—BLADE CLEANING SYSTEM. MAR. 18, 1975.

3,918,807.—CLEANING BLADE FOR PHOTOCOPIER. NOV. 11, 1975.

3,918,809.—APPARATUS FOR CLEANING A SURFACE SUPPORT. NOV. 11, 1975.

3,927,937.—CLEANING ASSEMBLY FOR AN ELECTROSTATOGRAPHIC DEVICE. DEC. 23, 1975. SPN. 0420425.

3,940,282.—BLADE CLEANING OF SURFACE WITH REVERSE MOVEMENT. FEB. 24, 1976.

3,947,108.—CLEANING SYSTEM. MAR. 30, 1976.

3,950,092.—CLEANING TRANSPORTING & SORTING APPARATUS & REPRODUCING MACHINE. APR. 13, 1976.

3,957,509.—METHOD AND APPARATUS FOR REMOVING CONTAMINANTS FROM AN ELECTROSTATIC IMAGING SURFACE. MAY 18, 1976.

3,973,845.—METHOD OF REDUCING FRICTION IN BLADE CLEANING OF IMAGING SURFACES. AUG. 10, 1976.

3,977,898.—METHOD FOR CLEANING A SURFACE SUPPORT. AUG. 31, 1976. GRB. 1438660.

3,992,091.—ROUGHENED IMAGING SURFACE FOR CLEANING. NOV. 16, 1976.

4,002,570.—ELECTROPHOTOGRAPHIC DEVELOPER WITH POLYVINYLIDENE FLUORIDE ADDITIVE. JAN. 11, 1977.

4,007,982.—METHOD AND APPARATUS FOR ULTRASONICALLY CLEANING A PHOTOCONDUCTIVE SURFACE. FEB. 15, 1977.

4,030,824.—A REPRODUCING APPARATUS HAVING AN IMPROVED IMAGING SURFACE CLEANING SYSTEM. JUNE 21, 1977.

Class 9A 1

3,099,856.—WEB CLEANER APPARATUS. AUG. 6, 1963. ARG. 0146853. CAN. 0760369, GRB. 1032957, IND. 0096310, JAP. 0481944.

3,149,356.—XEROGRAPHIC PLATE CLEANING APPARATUS. SEPT. 22, 1964.

3,186,838.—XEROGRAPHIC PLATE CLEANING METHOD UTILIZING THE RELATIVE MOVEMENT OF A CLEANING WEB. JUNE 1, 1965. CAN. 0858757, FRA. 1435510, GER. 1497242, GRB. 1094224, ITL. 0761145.

3,190,198.—XEROGRAPHIC CLEANING APPARATUS. JUNE 22, 1965.

3,337,891.—PLATE CLEANING AND TRANSPORTING APPARATUS. AUG. 29, 1967.

3,380,355.—XEROGRAPHIC CLEANING APPARATUS. APR. 30, 1968. CAN. 0819048.

3,405,682.—XEROGRAPHIC DEVELOPMENT APPTS WITH WEB LOADING MEANS TO REMOVE RESIDUAL DEVELOPER. OCT. 15, 1968. GRB. 1102282.

3,492,732.—WEB QUANTITY INDICATOR. FEB. 3, 1970. CAN. 0887178.

3,526,457.—CLEANING APPARATUS FOR ELECTROSTATIC COPYING MACHINES. SEPT. 1, 1970. CAN. 0880402, GRB. 1225287.

3,615,397.—METHOD OF CLEANING ELECTROSTATIC COPYING MACHINES. OCT. 26, 1971.

3,624,858.—CLEANING APPARATUS. DEC. 7, 1971.

3,664,300.—APPARATUS FOR TREATING THE SURFACE OF AN ELECTROSTATOGRAPHIC IMAGING PLATE. MAY 23, 1972.

3,725,059.—METHOD OF CLEANING AN ELECTROSTATOGRAPHIC SURFACE. APR. 3, 1973. GRB. 1337282.

3,781,107.—CLEANING APPARATUS. DEC. 25, 1973.

3,867,170.—METHOD FOR CLEANING LIQUID DEVELOPERS. FEB. 18, 1975. CAN. 0906336, GRB. 1339904.

3,879,785.—CLEANING APPARATUS. APR. 29, 1975.

4,007,983.—IMPROVED LIQUID DEVELOPER CLEANING MEANS. FEB. 15, 1977.

Class 9A 2

3,477,450.—BRUSH RECLAIMING. NOV. 11, 1969. GRB. 1206539.

3,489,463.—BRUSH SIZING APPARATUS. JAN. 13, 1970. GRB. 1243233, JAP. 0810578.

3,493,269.—LOADING HEAD. FEB. 3, 1970. CAN. 0864392.

3,610,693.—METHOD OF MAKING A CYLINDRICAL BRUSH. OCT. 5, 1971. CAN. 0944415, GRB. 1332920, JAP. 0758464.

3,617,123.—XEROGRAPHIC CLEANING APPARATUS. NOV. 2, 1971.

3,634,077.—METHOD AND APPARATUS FOR REMOVING A RESIDUAL IMAGE IN AN ELECTROSTATIC COPYING SYSTEM. JAN. 11, 1972. BEL. 0737956, CAN. 0896611, FRA. 6929217, GRB. 1259960, ITL. 0870232, JAP. 0742513.

3,664,300.—APPARATUS FOR TREATING THE SURFACE OF AN ELECTROSTATOGRAPHIC IMAGING PLATE. MAY 23, 1972.

3,766,593.—CLEANING APPARATUS FOR INSULATING SURFACES. OCT. 23, 1973. ARG. 0194956, AUS. 0460978, BEL. 0784898, CAN. 0990017, FRA. 7219012, GRB. 1399900, ITL. 0960138, MEX. 0127720. SPN. 404266, STZ. 0538310, SWD. 7208414, VZL. 0032065.

3,947,108.—CLEANING SYSTEM. MAR. 30, 1976.

3,957,509.—METHOD AND APPARATUS FOR REMOVING CONTAMINANTS FROM AN ELECTROSTATIC IMAGING SURFACE. MAY 18, 1976.

4,025,188.—PHOTOACTIVE DEVICE FOR XEROGRAPHY. MAY 24, 1977.

Class 9A 2A

2,751,616.—BRUSH CLEANING DEVICE. JUNE 26, 1956.

3,278,972.—XEROGRAPHIC PLATE CLEANING APPARATUS. OCT. 18, 1966. CAN. 0774795, FRA. 1458646, GER. 1497218, GRB. 1122624, ITL. 0729648, JAP. 0512649.

3,534,427.—CLEANING APPARATUS FOR ELECTROSTATIC PRINTING MACHINES. OCT. 20, 1970. AUS. 0425369, BEL. 0729977, CAN. 0873426, CZC. 0157666, FRA. 6907700, GRB. 1238117, HUN. 0158312, ITL. 0876795, JAP. 0645593, SPN. 0364889, SWD. 0345533, USR. 0372853.

3,590,412.—BRUSH CLEANING DEVICE FOR ELECTROSTATIC MACHINES. JULY 6, 1971. CAN. 0930107, GRB. 1248521, JAP. 0832526.

3,660,863.—CLEANING APPARATUS. MAY 9, 1972. ARG. 0188292, ATR. 0324838, AUS. 0445312, BEL. 0752937, CAN. 0925659, CHL. 0027132, DNK. 0129483, EGR. 0084130, FRA. 7024664. GRB. 1259446, GUA. 0002676, IND. 0127312, ITL. 0900201, MEX. 0115163, NOR. 0133164, NZL. 0160666, PLD. 0081341, PLP. 0007492, PNM. 0002014, PTG. 0054074, SAF. 0704533, SPN. 0381388, STZ. 0514165, SWD. 0359942, TIW. 0007784, USR. 0384250, VZL. 0032417.

3,692,402.—MATERIALS FOR FIBROUS DEVELOPMENT AND CLEANING MEMBER. SEPT. 19, 1972.

3,740,789.—XEROGRAPHIC ROLLER OSCILLATING CLEANING BLADE WITH DRIVE MECHANISM

THEREFOR. JUNE 26, 1973. BEL. 0789327, CAN. 0991250, FRA. 7233724, GER. 2243491, GRB. 1403440, ITL. 0967796, SWD. 7212455.

3,742,551.—TONER CLEANING AND STORAGE APPARATUS. JULY 3, 1973. BEL. 0789325, CAN. 0991694, FRA. 7233424, GER. 2239441, GRB. 1403439, ITL. 0967797, SWD. 7212456.

3,788,454.—CHAIN BEAD DRIVE APPARATUS. JAN. 29, 1974. GRB. 1430379.

3,795,025.—ELECTROPHOTOGRAPHIC PHOTORECEPTOR CLEANING APPARATUS. MAR. 5, 1974.

3,807,853.—ELECTROPHOTOGRAPHIC CLEANING APPARATUS. APR. 30, 1974. GRB. 1439229.

4,032,228.—FOREIGN OBJECT DETECTOR BRUSH CLEANER. JUNE 28, 1977.

Class 9A 2B

2,484,782.—METHOD OF REMOVING ELECTROSCOPIC POWDER FROM AN ELECTROPHOTOGRAPHIC PLATE. OCT. 11, 1949.

2,752,271.—ELECTROSTATIC CLEANING OF XEROGRAPHIC PLATES. JUNE 26, 1956.

2,832,977.—ELECTROSTATIC CLEANING DEVICE. MAY 6, 1958.

3,404,418.—SHEET TRANSPORT APPARATUS. OCT. 8, 1968. CAN. 0859327.

3,572,923.—CLEANING METHOD AND APPARATUS FOR ELECTROSTATIC COPYING MACHINES. MAR. 30, 1971. ARG. 0172603, AUS. 0429490, BEL. 0737957, CAN. 0884822, FRA. 6929174, GRB. 1259890, ITL. 0870233, JAP. 0819708, MEX. 0113040, SPN. 0370878, SWD. 0348851.

3,655,373.—CLEANING METHOD FOR ELECTROSTATIC COPYING MACHINE. APR. 11, 1972.

3,668,008.—IONIZED AIR CLEANING DEVICE. JUNE 6, 1972. CAN. 0956406, GRB. 1310836.

3,722,018.—CLEANING APPARATUS. MAR. 27, 1973.

3,738,745.—FUR BRUSH ERASER. JUNE 12, 1973. CAN. 0970554, GRB. 1418036.

Class 9A 2B 1

2,987,660.—XEROGRAPHIC CHARGING. JUNE 6, 1961.

3,128,683.—XEROGRAPHIC APPARATUS. APR. 14, 1964.

Class 9A 2C

3,252,274.—XEROGRAPHIC POWDER FILTER. MAY 24, 1966. CAN. 0712876, GER. 1278245, GRB. 1031634, JAP. 0502993.

3,410,060.—XEROGRAPHIC FILTER APPARATUS. NOV. 12, 1968. CAN. 0810976, FRA. 1458648, GRB. 1114505, ITL. 0729638, JAP. 0724232.

3,570,224.—FILTER FOR ELECTROSTATOGRAPHIC DEVELOPER. MAR. 16, 1971.

3,641,979.—TONER RECLAIMING SYSTEM. FEB. 15, 1972. CAN. 0913351.

3,793,986.—TONER RECLAIMING SYSTEM FOR ELECTROSTATIC PRINTING MACHINES. FEB. 26, 1974. ARG. 0194370, AUS. 0464194, BEL. 0784636, GER. 0978341, GRB. 1373721, ITL. 0956416, MEX. 0128265, SPN. 403.704, STZ. 0546970, VZL. 0033339.

3,816,157.—TONER RECLAIMING METHOD. JUNE 11, 1974.

Class 9B

2,772,991.—PROCESS OF CLEANING A RESIDUAL POWDER IMAGE FROM AN ELECTROPHOTOGRAPHIC PLATE. DEC. 4, 1956.

2,874,064.—XEROGRAPHIC CLEANER. FEB. 17, 1959.

3,332,328.—XEROGRAPHIC DEVELOPER SEAL AND PROCESS. JULY 25, 1967. CAN. 0792684, GRB. 1138394, JAP. 0512658, MEX. 0091318.

3,607,160.—LIGRCIN CONTAINING PUMICING COMPOSITION. SEPT. 21, 1971.

3,610,749.—IMAGING SYSTEM. OCT. 5, 1971. CAN. 0923541, GRB. 1339905, JAP. 0745767.

3,646,910.—DEVELOPMENT APPARATUS FOR LATENT ELECTROSTATIC IMAGES. MAR. 7, 1972.

3,668,008.—IONIZED AIR CLEANING DEVICE. JUNE 6, 1972. CAN. 0956406, GRB. 1310836.

3,697,263.—METHOD OF CLEANING RESIDUAL LIQUID DEVELOPER FROM ELECTROPHOTOGRAPHIC PLATES. OCT. 10, 1972. ARG. 0181940, AUS. 0455091, BEL. 0758060, CAN. 0906334, EGR. 0087483, FRA. 7041623, GRB. 1328406, ITL. 0916264, JAP. 0749381, MEX. 0116862, SPN. 0385000, STZ. 0519186, SWD. 0365624, TIW. 0006850, USR. 0349206, VZL. 0032211.

3,834,804.—COPYING MACHINE WITH MEANS FOR MOUNTING CARRIER BEAD PICKOFF ROLLER THEREIN. SEPT. 10, 1974.

4,026,701.—GAS IMPINGMENT & SUCTION CLEANING APPARATUS. MAY 31, 1977.

Class 9B 1

2,911,330.—MAGNETIC BRUSH CLEANING. NOV. 3, 1959.

3,920,329.—BACKGROUND REMOVAL APPARATUS. NOV. 18, 1975.

Class 9B 2

RE.28,566.—CLEANING APPARATUS. OCT. 7, 1975. CAN. 0913310, MEX. 0113698.

3,424,615.—METHOD AND APPARATUS FOR CLEANING XEROGRAPHIC PLATES. JAN. 28, 1969. CAN. 0842022, GRB. 1158521, JAP. 0561239.

3,580,673.—CLEANING APPARATUS-REISSUED AS RE28566-D2266R. MAY 25, 1971. CAN. 0913310, MEX. 0113698.

3,615,398.—METHOD FOR ELECTROSTATIC COPYING INCLUDING AN IMPROVED PROCESS OF CLEANING PHOTOCONDUCTV SRFACE. OCT. 26, 1971.

3,625,683.—PROCESS FOR CLEANING A PHOTO-CONDUCTIVE DRUM OF RESIDUAL TONER PARTICLES AND REUSE OF THE SAME. DEC. 7, 1971. CAN. 0937800, GRB. 1329982.

3,628,950.—METHOD OF REMOVING THE RESIDUAL TONER PARTICLES FROM A PHOTOCONDUCTIVE SURFACE. DEC. 21, 1971.

3,640,707.—IMAGING SYSTEM. FEB. 8, 1972.

3,655,375.—INTERMITTENT GRIT REMOVAL PROCESS. APR. 11, 1972. CAN. 0924493, GRB. 1341404, JAP. 0746926.

3,656,948.—SELECTED REMOVAL OF LIQUID DVLPR IN CYCLICAL ELECTROPHOTOGRAPHIC PROCESS. APR. 18, 1972. CAN. 0906335, GRB. 1335054, JAP. 0760503.

3,776,631.—LIQUID DEVELOPER CLEANING SYSTEM. DEC. 4, 1973.

Class 9B 3

2,987,660.—XEROGRAPHIC CHARGING. JUNE 6, 1961.

3,128,683.—XEROGRAPHIC APPARATUS. APR. 14, 1964.

3,483,034.—PROCESS OF CLEANING XEROGRAPHIC PLATES. DEC. 9, 1969. CAN. 0800825, FRA. 1463257, GER. 1497235, GRB. 1125594, ITL. 0750154.

3,592,678.—LIQUID DONOR DEVELOPMENT WITH ELECTROPHORETIC CLEANING. JULY 13, 1971.

3,620,800.—CLEANING LIQUID DEVELOPED ELECTROSTATIC IMAGES BY CONTACT WITH VAPORIZED CLEANING FLUID. NOV. 16, 1971. CAN. 0933997.

3,628,981.—LIQUID TONER DEVELOPMENT. DEC. 21, 1971. ARG. 0181932, MEX. 0116451.

3,671,290.—IMAGING SYSTEM. JUNE 20, 1972.

3,702,303.—CLEANING OF PHOTOCONDUCTIVE INSULATING SURFACES. NOV. 7, 1972. CAN. 0944650, GRB. 1369451.

3,762,950.—CLEANING OF PARTICLES FROM A SURFACE. OCT. 2, 1973. ARG. 0195076, AUS. 0464713, BEL. 7916681, CAN. 0974009, FRA. 7241538, GRB. 1400238, ITL. 0971072, MEX. 0128580, SPN. 0408837, STZ. 0553433, SWD. 7215089, VZL. 0032005.

3,849,171.—METHOD FOR CLEANING BACKGROUND AREAS FROM DEVELOPED RECORDING SURFACES. NOV. 19, 1974. CAN. 0941882.

3,862,801.—METHOD OF CLEANING AN ELECTROSTATOGRAPHIC IMAGING SURFACE. JAN. 28, 1975. GRB. 1337282.

3,937,665.—PHOTORECEPTOR SOLVENT CLEANER. FEB. 10, 1976.

3,979,317.—VOLATILE CLEANING SOLUTION FOR PHOTORECEPTOR. SEPT. 7, 1976.

Class 10

3,945,728.—AN ALARM FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. MAR. 23, 1976.

Class 10A

D.230,085.—COPY PAPER CASSETTE. JAN. 22, 1974.

2,738,705.—FILE-HOLDING DEVICE FOR CAMERA COPY SUPPORT. MAR. 20, 1956.

2,758,503.—COPY-HOLDING APPARATUS. AUG. 14, 1956.

2,822,172.—SHEET HANDLING MACHINE. FEB. 4, 1958. CAN. 0570493.

3,100,112.—DOCUMENT FEED MECHANISM. AUG. 6, 1963. GRB. 1015635, JAP. 0478676.
3,152,528.—DOCUMENT CARRIER. OCT. 13, 1964. CAN. 0707048, FRA. 1414049, GER. 1197744, GRB. 1032954, ITL. 0737307, JAP. 0471310.
3,220,275.—DOCUMENT DRIVE TRANSMISSION. NOV. 30, 1965.
3,239,215.—DOCUMENT FEED MECHANISM. MAR. 8, 1966. CAN. 0741548, GRB. 1052820, JAP. 0497188.
3,239,220.—DOCUMENT CONVEYOR. MAR. 8, 1966. CAN. 0770495, FRA. 1434188, GRB. 1094188, ITL. 0742434.
3,326,548.—CARD CONVEYING APPARATUS HAVING A ROTARY FRONT GAUGE. JUNE 20, 1967. CAN. 0793702, MEX. 0086197.
3,370,844.—CARD HANDLING-SCANNING DEVICE. FEB. 27, 1968.
3,409,356.—CONVEYOR FOR DOCUMENTS. NOV. 5, 1968. FRA. 1500227, GRB. 1162982, ITL. 0776597.
3,409,357.—APPARATUS FOR AN ELECTROSTATIC MACHINE. NOV. 5, 1968. CAN. 0816416, GRB. 1151104, JAP. 0542588.
3,419,264.—DOCUMENT HANDLING SYSTEM. DEC. 31, 1968. ARG. 0168399, CAN. 0831413, CHL. 0024536, JAM. 0002459, MEX. 0101167, PRU. 0009340, URG. 0009205, VZL. 0023735.
3,424,528.—DOCUMENT CONVEYOR UNIT. JAN. 28, 1969. CAN. 0842644, GRB. 1175596.
3,446,554.—XEROGRAPHIC REPRODUCING APPARATUS. MAY 27, 1969. ARG. 0171943, ATR. 0302040, AUS. 0451715, BEL. 0708649, CAN. 0880187, FRA. 1567148, GRB. 1223426, HUN. 0158170, ITL. 0823019, JAP. 0657008, LXB. 0055166, MEX. 0101029, NOR. 0127833, PLD. 0069795, SPN. 0348801, STZ. 0485581, SWD. 0354529, USR. 0259733, VZL. 0023685.
3,504,908.—DOCUMENT FEEDING APPARATUS CONTROL. APR. 7, 1970.
3,520,605.—DOCUMENT SCAN DRIVE AND RETURN APPARATUS. JULY 14, 1970. CAN. 0858848.
3,578,316.—DRIVING APPARATUS FOR ARTICLE FEEDERS. MAY 11, 1971. CAN. 0907653.
3,614,090.—DOCUMENT CONVEYOR. OCT. 19, 1971. ARG. 0183554, AUS. 0451766, BEL. 0751308, CAN. 0922330, EGR. 0081784, FRA. 7019911, GRB. 1311766, ITL. 0893688, MEX. 0118182, SPN. 0380271, STZ. 0512751, SWD. 0362150, TIW. 0007678, USR. 0349152, VZL. 0032780.
3,628,408.—STAMP DISPENSER. DEC. 21, 1971. CAN. 0931918, GRB. 1324699, JAP. 0755787.
3,628,786.—DOCUMENT HANDLING APPARATUS. DEC. 21, 1971. CAN. 0942552, GRB. 1329989.
3,630,515.—DOCUMENT HANDLING APPARATUS. DEC. 28, 1971.
3,630,519.—DOCUMENT FEED APPARATUS. DEC. 28, 1971. CAN. 0903779, GRB. 1329747.
3,649,447.—APPARATUS FOR DECURLING A PAPER WEB. MAR. 14, 1972. CAN. 0916185, GRB. 1288846.
3,674,363.—SHEET FEEDING APPARATUS. JULY 4, 1972. ARG. 0176106, ATR. 0307230, AUS. 0447387, BEL. 0734129, DNK. 0131336, FRA. 6919121, GRB. 1263192, ITL. 0866189, MEX. 0112842, SPN. 0368216, STZ. 0501500, SWD. 0356136, TIW. 0006604.
3,804,514.—DUAL FUNCTION DOCUMENT STOP FOR A COPYING DEVICE. APR. 16, 1974. FRA. 7334456, GRB. 1424060.
3,846,020.—ELECTROSTATIC SHEET TRANSPORT SYSTEM. NOV. 5, 1974.
3,860,339.—COPYING MACHINE. JAN. 14, 1975.
3,861,673.—BI-DIRECTIONAL SHEET TRANSPORT. JAN. 21, 1975.
3,874,651.—REGISTRATION EDGE FOR AUTOMATIC DOCUMENT HANDLER. APR. 1, 1975. GRB. 1467791.
3,884,408.—APPARATUS FOR EJECTING A STAPLED SET OF SHEETS SIDEWISE FROM THE COLLATING BINS. MAY 20, 1975.
3,885,782.—SHEET FEEDER. MAY 27, 1975. CAN. 3885782.
3,888,581.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.
3,888,582.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.
3,888,584.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.
3,888,585.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.
3,889,943.—PLATEN TRANSPORT FOR AUTOMATIC DOCUMENT HANDLER. JUNE 17, 1975.
3,900,258.—EXPOSURE APPARATUS. AUG. 19, 1975. AUS. 0474469, CAN. 1004724, GRB. 1424242, ITL. 0993030, SPN. 0418138, SWD. 7311579.
3,901,594.—SEMI-AUTOMATIC DOCUMENT HANDLER. AUG. 26, 1975.
3,909,129.—DOCUMENT FEEDING APPARATUS. SEPT. 30, 1975.
3,915,447.—HORIZONTAL PLATEN BELT TRANSPORT. OCT. 28, 1975.
3,941,376.—AUTOMATIC DOCUMENT HANDLER-ARDRI ADH PLATEN TRANSPORT MOUNTING. MAR. 2, 1976. BEL. 0799234, CAN. 0993906, FRA. 7316540, GRB. 1421427, ITL. 0987317, SPN. 0414541.
3,941,473.—MANUAL ASSIST DOCUMENT FEEDER. MAR. 2, 1976.
3,944,365.—DOCUMENT FEEDING APPARATUS AND LATCHING MECHANISM. MAR. 16, 1976.
3,944,794.—COPYING SYSTEM CONTROL. MAR. 16, 1976. ARG. 0204710, BEL. 0808230, CAN. 1007289, FRA. 7343289, GRB. 1450707, ITL. 1002162, MEX. 0135679, SPN. 0421150, STZ. 0577391, USR. 0543364.
3,947,111.—DOCUMENT FEEDING APPARATUS. MAR. 30, 1976.
3,953,122.—DOCUMENT ORIGINAL HANDLING SYSTEM. APR. 27, 1976.
3,954,259.—DOUBLE BAR SEPARATOR FOR A SHEET RECEIVING TRAY. MAY 4, 1976.
3,959,573.—COMPOSITIONS AND METHODS FOR MAKING BIASABLE MEMBERS. MAY 25, 1976.
3,963,345.—PRE-COLLATION COPYING. JUNE 15, 1976.
3,977,780.—ELECTROSTATIC REPRODUCTION METHOD AND APPARATUS. AUG. 31, 1976.
3,981,498.—NON-UNIFORM CHARGING OF SHEET MATERIAL. SEPT. 21, 1976.
3,982,832.—ELECTROSTATOGRAPHIC COPYING MACHINES. SEPT. 28, 1976.
3,984,099.—AN IMPROVED DOCUMENT FEEDING SYSTEM. OCT. 5, 1976.
3,988,065.—REFLECTIVE DOCUMENT FEEDER. OCT. 26, 1976.
3,997,263.—BI-DIRECTIONAL COPIER OUTPUT. DEC. 14, 1976. BEL. 0839792, SPN. 0445641.
4,000,943.—DUAL PURPOSE DOCUMENT HANDLING SYSTEM. JAN. 4, 1977. BEL. 0837235.
4,004,941.—CLEANING METHOD FOR AUTOMATIC DOCUMENT HANDLER. JAN. 25, 1977.
4,008,956.—DOCUMENT HANDLING SYSTEM FOR PRE-COLLATION COPYING. FEB. 22, 1977. BEL. 0839792, SPN. 0445641.
4,012,140.—COPIER DOCUMENT LOADING SYSTEM. MAR. 15, 1977. BEL. 0839792, SPN. 0445641.
4,017,172.—DOCUMENT FEEDING APPARATUS. APR. 12, 1977.
4,018,523.—REPRODUCING APPARATUS AND PROCESS FOR FORMING MULTIPLE COPIES OF A DOCUMENT. APR. 19, 1977. BEL. 0842928.
4,030,721.—AUTOMATIC MANUSCRIPT DISCHARGING DEVICE FOR COPYING MACHINES. JUNE 21, 1977.
4,033,694.—COPIER DOCUMENT EJECTOR. JULY 5, 1977.
4,034,869.—FLUID MEANS TO LOAD AND UNLOAD A VERTICALLY MOVABLE DOCUMENT STORAGE RACK. JULY 12, 1977.

Class 10B

3,094,036.—IMAGE SELECTOR APPARATUS. JUNE 18, 1963. CAN. 0683832.
3,139,279.—RECORD CARD MAGAZINE. JUNE 30, 1964. CAN. 0717868.
3,180,637.—RECORD CARD FEEDING APPARATUS. APR. 27, 1965. CAN. 0806932.
3,357,574.—SEQUENTIAL CONTROL SYSTEM. DEC. 12, 1967. CAN. 0824898.
3,383,105.—CARD PICK-OFF APPARATUS. MAY 14, 1968. CAN. 0820743, GRB. 1193512, JAP. 0610154.
3,482,917.—CARD TRANSPORT APPARATUS. DEC. 9, 1969. CAN. 0842646, GRB. 1193516.
3,784,303.—AUTOMATIC MICROFICHE COPIER. JAN. 8, 1974. CAN. 1000779, GRB. 1412221.

Class 10C

2,956,804.—VACUUM FEED ASSEMBLY FOR FLAT PIECES. OCT. 18, 1960.
3,239,213.—DOCUMENT FEEDER. MAR. 8, 1966. CAN. 0766646, FRA. 1447269, GER. 1243698, GRB. 1087786, ITL. 0761046, JAP. 0497197.
3,506,257.—DOCUMENT FEEDING APPARATUS. APR. 14, 1970. CAN. 0885333, GRB. 1253416.
3,567,214.—SHEET FEEDING AND SEPARATING APPARATUS. MAR. 2, 1971. BEL. 0734128, CAN. 0902124, FRA. 6919122, GER. 1929105, GRB. 1263193, HOL. 0144551, ITL. 0866188, SPN. 0368173, STZ. 0501501, SWD. 6908176.

3,861,671.—LIFTABLE BAIL BAR FOR ALLOWING RETURN OF MULTIPLY SEPARATED SHEETS TO STACK. JAN. 21, 1975.
3,895,790.—MOVABLE BAIL BAR. JULY 22, 1975. BEL. 0815050, CAN. 1009267.
3,936,180.—XEROGRAPHIC APPARATUS WITH SAMPLE PRINT CAPABILITIES. FEB. 3, 1976. BEL. 0809398, ITL. 1006708.
3,968,364.—HEIGHT SENSING DEVICE. JULY 6, 1976.
3,993,300.—AUTOMATIC FEEDER FOR COMPOSITE COPYING. NOV. 23, 1976. BEL. 0815215, GRB. 1467996, STZ. 0561917.
4,025,068.—SHEET FEEDER. MAY 24, 1977.

Class 10D

3,239,213.—DOCUMENT FEEDER. MAR. 8, 1966. CAN. 0766646, FRA. 1447269, GER. 1243698, GRB. 1087786, ITL. 0761046, JAP. 0497197.
3,495,904.—RADIANT ENERGY PROTECTIVE APPARATUS. FEB. 17, 1970.
3,581,000.—INCREMENTAL STEPPING PAPER DRIVE. MAY 25, 1971.
3,618,123.—FACSIMILE DRUM CONVEYOR. NOV. 2, 1971. ARG. 0181314, BEL. 0743659, CAN. 0918186, FRA. 6944287, GER. 1963786, GRB. 1280340, ITL. 0880304, JAP. 0852728, MEX. 0122967, SPN. 0374915, SWD. 0363457, VZL. 0025438.
3,790,159.—AUTOMATIC DOCUMENT HANDLING DEVICE. FEB. 5, 1974. CAN. 1013377, GRB. 1417793.
3,815,899.—SHEET DELIVERY DEVICE. JUNE 11, 1974. CAN. 0994377, FRA. 7409303, GRB. 1456422.
3,854,715.—CAM. DEC. 17, 1974. CAN. 1007256, GRB. 1456576.

Class 10E

3,288,459.—DOCUMENT FEEDING APPARATUS. NOV. 29, 1966. CAN. 0788345, JAP. 0632541, MEX. 0086958.
3,300,208.—COPY POSITIONING APPARATUS AND METHOD. JAN. 24, 1967. CAN. 0817270, JAP. 0605646, MEX. 0090842.
3,473,035.—DOCUMENT TRANSPORT AND REGISTRATION SYS USING PHOTOCELLS. OCT. 14, 1969. ARG. 0170131, CAN. 0858983, CHL. 0024005, JAM. 0001926, MEX. 0101674, PRU. 0009301, URG. 0009238, VZL. 0023677.
3,510,125.—DOCUMENT REGISTRATION SYSTEM. MAY 5, 1970. BEL. 0726865, CAN. 0897195, FRA. 2000318, GER. 1902112, GRB. 1253417, ITL. 0854755, JAP. 0783473.
3,558,223.—DOCUMENT CENTERING APPARATUS. JAN. 26, 1971.
3,630,611.—DOCUMENT REGISTRATION APPARATUS. DEC. 28, 1971.
3,630,620.—PLATEN COVER FOR COPYING MACHINES. DEC. 28, 1971. CAN. 0921307, GRB. 1309313.
3,642,370.—DOCUMENT PRESENTATION DEVICE. FEB. 15, 1972. GRB. 1206633.
3,724,941.—ELECTROPHOTOGRAPHIC APPARATUS. APR. 3, 1973.
3,741,644.—ORIGINAL POSITION CONFIRMING MEANS FOR DUPLICATING APPARATUS. JUNE 26, 1973.
3,771,082.—COPYING APPARATUS WITH AUXILIARY LIGHT SOURCE FOR ILLUMINATING AN ORIGINAL TO BE REPRODUCED. NOV. 6, 1973.
3,829,082.—AUTOMATIC DOCUMENT HANDLER. AUG. 13, 1974. CAN. 0986958, GRB. 1421425.
3,854,715.—CAM. DEC. 17, 1974. CAN. 1007256, GRB. 1456576.
3,861,673.—BI-DIRECTIONAL SHEET TRANSPORT. JAN. 21, 1975. CAN. 1004240.
3,877,804.—CORNER REGISTRATION DEVICE FOR DOCUMENT FEEDER. APR. 15, 1975.
3,883,134.—DETECTING AND REMOVING APPARATUS FOR SKEW FED SHEETS. MAY 13, 1975.
3,915,447.—HORIZONTAL PLATEN BELT TRANSPORT. OCT. 28, 1975.
3,984,098.—PNEUMATIC REGISTRATION AND CLAMPING APPARATUS. OCT. 5, 1976. BEL. 0848824.
3,984,099.—AN IMPROVED DOCUMENT FEEDING SYSTEM. OCT. 5, 1976.
3,990,794.—COPYING MACHINE. NOV. 9, 1976. STZ. 0587508.
4,026,542.—DUAL REGISTRATION APPARATUS. MAY 31, 1977.
4,029,411.—VARIABLE MAGNIFICATION COPIER. JUNE 14, 1977. BEL. 0839792, SPN. 0445641.
4,033,574.—DOCUMENT HANDLING APPARATUS. JULY 5, 1977.
4,033,694.—COPIER DOCUMENT EJECTOR. JULY 5, 1977.

Class 10F

3,288,464.—CARD INVERTING APPARATUS. NOV. 29, 1966. CAN. 0803316, JAP. 0547200.
3,408,140.—DOCUMENT HANDLING APPARATUS. OCT. 29, 1968. CAN. 0842643, GRB. 1143062.
3,416,791.—DOCUMENT INVERTING APPARATUS. DEC. 17, 1968. CAN. 0853562, GRB. 1210564, JAP. 0648074.
3,844,654.—DUPLEX COPYING SYSTEM. OCT. 29, 1974. FRA. 7340246, GRB. 1445854.
3,862,802.—SHEET REVERSING APPARATUS AND A DUPLEX REPRODUCING APPARATUS EMPLOYING SAME. JAN. 28, 1975. BEL. 0818894.
3,926,338.—THERMALLY INSENSITIVE PARTICLE CONCENTRATION CONTROLLER. DEC. 16, 1975.
3,980,406.—DUPLEX IMAGING SYSTEM. SEPT. 14, 1976.

Class 10G

2,889,029.—LABEL APPLYING MACHINE. JUNE 2, 1959.
2,925,167.—CONVEYOR FOR ARTICLES IN IMBRICATING. FEB. 16, 1960.
3,419,265.—DOCUMENT STACKER APPARATUS. DEC. 31, 1968. ARG. 0171423, CAN. 0833415, CHL. 0024006, JAM. 0001859, MEX. 0100967, PRU. 0001930, URG. 0009140, VZL. 0023736.
3,460,825.—FAN FOLD STACKING APPARATUS. AUG. 12, 1969. CAN. 0855586, GRB. 1205418.
3,497,207.—SORTING APPARATUS FOR DOCUMENTS. FEB. 24, 1970. BEL. 0727203, CAN. 0895731, FRA. 6900957, GRB. 1245841, HOL. 0148006, ITL. 0854588.
3,630,517.—COUNTER STACKER. DEC. 28, 1971.
3,729,188.—DOCUMENT STACKER APPARATUS. APR. 24, 1973. CAN. 1000311, FRA. 0701711, GRB. 1303165, ITL. 0893040.
3,865,480.—ELECTROSTATIC CONTROL OF FAN FOLD PAPER STACKING. FEB. 11, 1975.
4,017,066.—SET SEPARATOR. APR. 12, 1977.
4,033,579.—AN OFFSET STACKER. JULY 5, 1977.

Class 10H

3,467,371.—SHEET DISTRIBUTOR. SEPT. 16, 1969. ARG. 0168293, ATR. 0294140, AUS. 0423257, BEL. 0702898, CAN. 0925803, CHL. 0023102, CLB. 0017542, DNK. 0124250, EIR. 0031306, FIN. 0047869, FRA. 1541084, GRB. 1193513, GRK. 0038675, IND. 0112000, ISR. 0028519, ITL. 0813836, JAP. 0645588, LXB. 0054335, MEX. 0099952, NOR. 0124920, NZL. 0149788, PAK. 0118964, PLP. 0006507, PRU. 0009477, PTG. 0048210, SAF. 0674986, SPN. 0344349, STZ. 0480253, SWD. 0337384, TRK. 0015492, URG. 0008974, VZL. 0026276.
3,815,896.—AUTOMATIC DOCUMENT HANDLER. JUNE 11, 1974. BEL. 0797889, CAN. 0984863, FRA. 7316287, GRB. 1421426, ITL. 0987316, SPN. 0414486.
3,884,408.—APPARATUS FOR EJECTING A STAPLED SET OF SHEETS SIDEWISE FROM THE COLLATING BINS. MAY 20, 1975.
3,907,277.—METHOD AND DEVICE FOR REMOVING DOCUMENTS FROM A PLATEN. SEPT. 23, 1975.
3,913,467.—COLLATING APPARATUS. OCT. 21, 1975.
3,944,207.—LIMITLESS SORTER. MAR. 16, 1976.
3,944,366.—SLIDING PLATEN COVER APPARATUS. MAR. 16, 1976.
3,963,345.—PRE-COLLATION COPYING. JUNE 15, 1976. BEL. 0839792, SPN. 0445641.
3,997,263.—BI-DIRECTIONAL COPIER OUTPUT. DEC. 14, 1976. BEL. 0839792, SPN. 0445641.
4,008,956.—DOCUMENT HANDLING SYSTEM FOR PRE-COLLATION COPYING. FEB. 22, 1977. BEL. 0839792, SPN. 0445641.
4,012,140.—COPIER DOCUMENT LOADING SYSTEM. MAR. 15, 1977. BEL. 0839792, SPN. 0445641.

Class 10I

3,495,904.—RADIANT ENERGY PROTECTIVE APPARATUS. FEB. 17, 1970.
3,600,610.—TIME DELAY CIRCUIT FOR A RADIANT ENERGY PROTECTIVE APPARATUS. AUG. 17, 1971.
3,609,737.—METHOD AND APPARATUS FOR ARTICLE DETECTION UTILIZING CORONA DISCHARG. SEPT. 28, 1971. CAN. 0872468, GER. 1932248, GRB. 1259998, JAP. 0657911.
3,672,760.—XEROGRAPHIC PLATE TRANSPORTING MECHANISM. JUNE 27, 1972. CAN. 0939555, GRB. 1359888.
3,674,363.—SHEET FEEDING APPARATUS. JULY 4, 1972. ARG. 0176106, ATR. 0307230, AUS. 0447387, BEL. 0734129, DNK. 0131336, FRA. 6919121, GRB. 1263192,

ITL. 0866189, MEX. 0112842, SPN. 0368216, STZ. 0501500, SWD. 0356136, TIW. 0006604.

3,697,063.—DOCUMENT HANDLING APPARATUS. OCT. 10, 1972. GRB. 1369618.

3,744,047.—SUPERPOSED SHEET DETECTION. JULY 3, 1973. CAN. 0985762, FRA. 7231694, GRB. 1396560, ITL. 0967501.

3,748,088.—FUSER CONTROL APPARATUS. JULY 24, 1973.

3,778,618.—PHOTODETECTION OF NON-OPAQUE OBJECTS TRANSPRTD ALONG A CONVEYOR BY USE OF A LIGHT BLCKING OPAQU. DEC. 11, 1973. GRB. 1406170.

3,790,158.—AUTOMATIC DOCUMENT HANDLER. FEB. 5, 1974. GRB. 1421428.

3,894,513.—COPYING MACHINE WITH BEAD PICKOFF ROLLER. JULY 15, 1975. FRA. 7342586, GRB. 1441288.

3,945,546.—ZIG ZAG FOLDED STRIP BOTTOM FEEDER. MAR. 23, 1976.

Class 12

4,027,138.—A FUSER RELEASE MATERIAL DISPENSER. MAY 31, 1977.

Class 12A

3,384,488.—POLYCHROMATIC PHOTOELECTROPHORETIC IMAGING COMPOSITION. MAY 21, 1968.

3,384,565.—PROCESS OF PHOTOELECTROPHORETIC COLOR IMAGING. MAY 21, 1968. ARG. 0149921, ATR. 0304268, AUS. 0414156, BEL. 0667116, BRA. 0087920, CAN. 0867678, CHL. 0021697, CLB. 0014706, FRA. 1450843, GER. 1497243, GRB. 1124626, GRK. 0030605, IND. 0119647, ISR. 0023973, ITL. 0744030, JAP. 681941, LXB. 0049058, MEX. 0091899, NOR. 0128733, NZL. 0142323, PPU. 0009538, PTG. 0044324, SAF. 653922, SPN. 0321858, STZ. 0481409, SWD. 6509579, URG. 0009540. VZL. 0017273.

3,384,566.—METHOD OF PHOTOELECTROPHORETIC IMAGING. MAY 21, 1968.

3,734,610.—MICROFICHE VIEWER-COPIER WITH BILLING DATA STORAGE. MAY 22, 1973. CAN. 1003025.

3,759,611.—MICROIMAGE RANSOM ACCESS AND RETRIEVAL PRINTER. SEPT. 18, 1973. CAN. 0987156, GRB. 1427017.

Class 12B

3,383,993.—PHOTOELECTROPHORETIC IMAGING APPARATUS. MAY 21, 1968. ARG. 0165160, AUS. 0419734, BEL. 0692048, CAN. 0866143, FRA. 1507051, GRB. 1158301, GRK. 0033285, HOL. 0150926, ITL. 0862555, LXB. 0052738, MEX. 0096357, PTG. 0044324, SAF. 0067022, SPN. 0335121, STZ. 0510901, VZL. 0024450.

3,610,748.—PHOTOELECTROPHORETIC IMAGING SYSTEM. OCT. 5, 1971. BEL. 0752438, CAN. 0922569, FRA. 7023045, GRB. 1319532, ITL. 0894621, JAP. 0739527.

3,656,847.—ELEVATOR MECHANISM. APR. 18, 1972.

3,663,396.—KINESCOPE PHOTOELECTROPHORETIC IMAGING METHODS AND SYSTEMS. MAY 16, 1972. ARG. 0196858, BEL. 0762417, CAN. 0935965, FRA. 7104350, GRB. 1345571, ITL. 0918121, JAP. 0743838, MEX. 0131834.

3,697,409.—BELT ELECTRODE IMAGING SYSTEM. OCT. 10, 1972. ARG. 0183572, BEL. 0760077, BRA. 7023343, CAN. 0937803, FRA. 7045072, GRB. 1339734, ITL. 0913368, JAP. 0752721, MEX. 0119368, VZL. 0032930.

3,844,779.—PHOTOELECTROPHORETIC IMAGING METHOD EMPLOYING A BELT ELECTRODE. OCT. 29, 1974.

Class 12C

3,427,242.—APPARATUS FOR CONTINUOUS PHOTOELECTROPHORETIC IMAGING. FEB. 11, 1969. BEL. 0743902, CAN. 0851701, FRA. 1521727, GER. 1572385, GRB. 1185932, ITL. 0794269, JAP. 0580245, MEX. 0097005.

3,474,019.—PHOTOELECTROPHORETIC IMAGING MTD INC. CONTACTNG IMGNG SUSPNSN W/ ALG SFC OF FLEXIBLE ELECTRODE. OCT. 21, 1969. AUS. 0418224, BEL. 0692912, BRA. 6678842, CAN. 0834679, GRK. 0033301, LXB. 0052730, MEX. 0090286, PTG. 0046984, SAF. 0670024, SPN. 0335454.

3,551,320.—IMAGING APPARATUS. DEC. 29, 1970.

3,600,081.—IMAGING APPARATUS. AUG. 17, 1971. ARG. 0192211, ATR. 0324839, AUS. 0455820, BEL. 0758903, CAN. 0936732, CZC. 0164288, EGR. 0090482. FRA. 7041652, GRB. 1335990, ITL. 0909307, JAP. 0751878, MEX. 0122272, PNM. 0002094, SPN. 0385453, STZ. 0518582, SWD. 0362717, TIW. 0008461, USR. 0412697, VZL. 0032926.

3,609,028.—IMAGING APPARATUS. SEPT. 28, 1971. ARG. 0186570, ATR. 0319749, AUS. 0455572, BEL. 0758806, CAN. 0935012, EGR. 0086977, FRA. 7041648, GRB. 1335988, ITL. 0909306, MEX. 0121331, PLD. 0082852, PNM. 0002167, SPN. 0385452, STZ. 0518580, SWD. 0361753, TIW. 0007385, USR. 0465806, VZL. 30683.

3,622,691.—HIGH SPEED LIGHT RESPONSIVE TRANSFORM COMPUTER FOR A LIGHT-SENSITIVE PRINTING SYSTEM. NOV. 23, 1971. CAN. 0915813, GRB. 1335222, JAP. 0774709.

3,642,365.—AUTOMATED IMAGING MACHINE. FEB. 15, 1972. ARG. 0183571, ATR. 0324123, AUS. 0456428, BEL. 0758902, CAN. 0937440, EGR. 0091986, FRA. 7041647, GRB. 1337145, ITL. 0909311, JAP. 0758463, MEX. 0120289, PLD. 0082861, PNM. 0002255, SPN. 0385457. STZ. 0544327, SWD. 0367493, TIW. 0007386.

3,642,606.—APPARATUS FOR IMAGE FORMATION ON THE INSIDE OF A CYLINDER. FEB. 15, 1972. ARG. 0183573, BEL. 0760749, BRA. 7022094, CAN. 0938490, FRA. 7047632, GRB. 1339578, ITL. 0913902, JAP. 0752722, MEX. 0119589, VZL. 0032929.

3,644,035.—FLAT PLATE TRAVELING ROLLER IMAGING. FEB. 22, 1972. ARG. 0183670, AUS. 0456429, BEL. 0758904, BRA. 7023406, CAN. 0923356, EGR. 0090280, FRA. 7041653, GRB. 1335051, ITL. 0909308, JAP. 0751879, MEX. 0119530, PLD. 0082860, SPN. 0385454, STZ. 0528763, SWD. 0367074, TIW. 0008460, USR. 0404290, VZL. 30682.

3,645,616.—PHOTOELECTROPHORETIC IMAGE TRANSFER APPARATUS. FEB. 29, 1972. CAN. 0949049, GRB. 1337417, JAP. 783768.

3,647,290.—PHOTOELECTROPHORETIC IMAGING SYSTEM. MAR. 7, 1972. ARG. 0184762, AUS. 0454820, BEL. 0058902, CAN. 0939954, EGR. 0090483, FRA. 7061651, GER. 1337416, GRB. 1337416, ITL. 0909312, JAP. 0751880, MEX. 0119752, SPN. 0385458, STZ. 0530662, SWD. 0366850, TIW. 0007384, USR. 0419062, VZL. 30685.

3,667,842.—IMAGING APPARATUS. JUNE 6, 1972. ARG. 0193347, BEL. 0768538, CAN. 0953559, FRA. 7122750, GRB. 1350395, ITL. 0927384, MEX. 0123298.

3,703,335.—MULTIPLE EXPOSURE IMAGING APPARATUS. NOV. 21, 1972. BEL. 0760457, CAN. 0968605, FRA. 7047141, GRB. 1339550, ITL. 0913636, JAP. 0759479.

3,719,484.—PHOTOELECTROPHORETIC IMAGING METHOD. MAR. 6, 1973. CAN. 0957890, GRB. 1369701.

3,728,018.—IMAGING APPARATUS. APR. 17, 1973. CAN. 0924156, GRB. 1335697.

3,800,743.—MATERIALS APPLICATION APPARATUS. APR. 2, 1974.

3,860,336.—PHOTOELECTROPHORETIC IMAGING MACHINE AND APPTS FOR CONTACTING A ROLLER TO A SURFACE TO BE CONTACT. JAN. 14, 1975.

3,860,337.—MULTIPLE EXPOSURE METHOD AND APPARATUS. JAN. 14, 1975. CAN. 0957890, GRB. 1369701.

3,990,043.—CHARACTER CODING AND RECOGNITION SYSTEM. NOV. 2, 1976.

4,006,982.—PHOTOELECTROPHORETIC CONCURRENT PROCESS CYCLING. FEB. 8, 1977. BEL. 0841077.

4,009,466.—CHARACTER CODING AND RECOGNITION SYSTEM. FEB. 22, 1977.

Class 12D

3,448,025.—PHOTOELECTROPHORETIC IMAGING SYSTEM UTILIZING A PROGRAMMED POTENTIAL APPLICATION. JUNE 3, 1969. ARG. 0167580, AUS. 0417981. BEL. 0719188, CAN. 0875492, FRA. 0095530, GER. 1797123, GRB. 1149666, ITL. 0890086, MEX. 0100805, VZL. 0025946.

3,485,738.—PHOTOELECTROPHORETIC IMG PROCESS EMPLOYNG LAYER OF INSULATNG LIQUID TO IMPROVE IMAGE QUALITY. DEC. 23, 1969. AUS. 0431891, BEL. 0743640, CAN. 0850591, GER. 1522751, GRB. 1174831, JAP. 0578397.

3,565,614.—IMAGE TRANSFER. FEB. 23, 1971. ARG. 0157773, AUS. 0413930, BEL. 0696853, CAN. 0890362, FRA. 1520919, GER. 1572384, GRB. 1185931, ITL. 0801198, JAP. 0586922, MEX. 0099070, SPN. 0349966, STZ. 0482230, SWD. 0332754, VZL. 0024013.

3,582,205.—IMAGING APPARATUS. JUNE 1, 1971.

3,616,398.—PHOTOELECTROPHORETIC IMAGING COMPOSITION CONTAINING B-CAROTENE. OCT. 26, 1971.
3,657,103.—ELECTRODE IMAGING SYSTEM. APR. 18, 1972. CAN. 0890360, GRB. 1309663, JAP. 0731609.
3,697,407.—PREVENTION OF ARCING IN AN ELECTRODE IMAGING SYSTEM. OCT. 10, 1972. CAN. 0884225, GRB. 1309127, JAP. 0731608.
3,697,408.—IMAGING SYSTEM. OCT. 10, 1972. CAN. 0890361, GRB. 1312733, JAP. 0731610.
3,708,286.—PHOTOELECTROPHORETIC IMAGING WITH ULTRASONIC VIBRATION DURING IMAGING. JAN. 2, 1973. ARG. 0174613, ATR. 0293874, AUS. 0455712, BEL. 0739747, CAN. 0922141, FRA. 6933738, GER. 1949416, GRB. 1279285, HOL. 0146950, ITL. 0877873, JAP. 0709042, MEX. 0108820.
3,853,556.—METHOD FOR ELIMINATING ELECTRICAL ARCING DURING PHOTOELECTROPHORETIC IMAGING. DEC. 10, 1974.

Class 12E

3,535,221.—PHOTOELECTROPHORETIC IMAGING SYSTEM EMPLOYING A PHOTOCONDUCTOR COATING FOR THE BLOCKING ELECTRO. OCT. 20, 1970. ARG. 0176485, AUS. 0448560, BEL. 0722301, CAN. 0891971, FRA. 1587938, GER. 1802988, GRB. 1236619, ITL. 0845022, JAP. 0693378, MEX. 0108364, VZL. 0023742.
3,595,771.—METHOD OF REMOVING ACCUMULATED CHARGES IN PHOTOELECTROPHORETIC IMAGING. JULY 27, 1971. ARG. 0198476, ATR. 0302041, AUS. 0448837, BEL. 0737549, CAN. 0922955, FRA. 6927969, GER. 1941463, GRB. 1267255, ITL. 0869935, JAP. 0704156, SWD. 0341726.
3,639,224.—PHOTOELECTROPHORETIC IMAGING SYSTEM. FEB. 1, 1972. CAN. 0922568, GRB. 1313683, JAP. 0739526.
3,657,103.—ELECTRODE IMAGING SYSTEM. APR. 18, 1972. CAN. 0890360, GRB. 1309663, JAP. 0731609.
3,669,872.—IMAGING SYSTEM. JUNE 13, 1972.
3,775,107.—IMAGING SYSTEM. NOV. 27, 1973.
3,859,576.—HIGH PERFORMANCE BLOCKING ELECTRODE FOR ELECTROPHOTOPHORESIS. JAN. 7, 1975. BEL. 0810802, ITL. 1006354.
3,866,572.—FORAMINOUS ELECTROSTATOGRAPHIC TRANSFER SYSTEM. FEB. 18, 1975. BEL. 0815546, CAN. 1009503, FRA. 7418641, GRB. 1448386, ITL. 1012842, SPN. 0426760.
3,956,524.—METHOD FOR THE PREPARATION OF ELECTROSTATOGRAPHIC AND PHOTORECEPTORS. MAY 11, 1976.
3,966,466.—PHOTOELECTROPHORETIC IMAGING PROCESS USING DARK CHARGE INJECTING AGENT ON BLOCKING ELECTRODE. JUNE 29, 1976.
3,967,961.—PHOTOELECTROPHORETIC IMAGING PROCESS EMPLOYING A DARK CHARGE INJECTING AGENT-AKLYD RESIN COATING. JULY 6, 1976.
3,980,477.—PHOTOELECTROPHORESIS WITH DARK CHARGE INJECTING ELEMENT. SEPT. 14, 1976.

Class 12F

3,695,755.—PHOTOELECTROPHORETIC CAMERA. OCT. 3, 1972. CAN. 0958580, GRB. 1359694.
3,702,289.—PHOTOELECTROPHORETIC PROC-ESS AND APPARATUS. NOV. 7, 1972. CAN. 0958579, GRB. 1359695.
3,705,766.—PHOTOELECTROPHORETIC APPARATUS. DEC. 12, 1972. CAN. 0955100, GRB. 1359862.

Class 12G

3,655,550.—ELECTROSTATIC PIGMENT FILTER. APR. 11, 1972.
3,656,200.—CLEANING APPARATUS. APR. 18, 1972.
3,658,687.—APPARATUS FOR FORMING IMAGES WITH APPLICATOR SHEARING SMOOTHING AND CLEANING MEANS. APR. 25, 1972. CAN. 0916433, GRB. 1337149, JAP. 0751881.
3,659,302.—CLEANING APPARATUS. MAY 2, 1972.
3,673,632.—CLEANING APPARATUS. JULY 4, 1972.
3,686,035.—CLEANING APPARATUS. AUG. 22, 1972. CAN. 0925660, GRB. 1335989.
3,821,027.—METHOD OF CLEANING ACCUMULATED MATERIAL FROM A SLOT. JUNE 28, 1974.
3,919,737.—CLEANING APPARATUS. NOV. 18, 1975.
3,945,724.—VELOCITY COMPOSITION FOR BEAD BYPASS. MAR. 23, 1976.
3,950,088.—VELOCITY COMPENSATION FOR BEAD BYPASS WITH SPEED REDUCTION. APR. 13, 1976.
3,986,772.—BEAD BYPASS. OCT. 19, 1976.
3,988,060.—BEAD BYPASS SPEED REDUCTION. OCT. 26, 1976.
3,989,365.—MOTION COMPENSATION FOR BEAD BYPASS. NOV. 2, 1976.

Class 12H

3,505,131.—PROCESS FOR THE PREPARATION OF A CUPROUS IODIDE CONDUCTIVE FILM. APR. 7, 1970. CAN. 0876074, GER. 1800653, GRB. 1244012, JAP. 0615874.
3,623,680.—CLUTCH/BRAKE MECHANISM. NOV. 30, 1971.
3,623,805.—DRIVE MECHANISM FOR IMAGING APPARATUS. NOV. 30, 1971.
3,628,859.—IMAGING MACHINE IMPROVEMENT. DEC. 21, 1971. BEL. 0760455, CAN. 0937436, FRA. 7047139, GRB. 1339549, ITL. 0913635, JAP. 0764505.
3,630,615.—METHOD AND APPARATUS FOR TRANSPORTING SUPPORT MATERIAL. DEC. 28, 1971.
3,630,884.—TRANSPARENT ELECTRODE IMAGING IMPROVEMENT. DEC. 28, 1971. CAN. 0890359, GRB. 1313696, JAP. 0739525.
3,639,049.—COPY SYSTEM. FEB. 1, 1972.
3,640,616.—OPAQUE ILLUMINATION AND SCANNING SYSTEM. FEB. 8, 1972. CAN. 0926674, GRB. 1337418, JAP. 0731615.
3,647,294.—MATERIALS APPLICATION AND CLEANING APPARATUS FOR XEROGRAPHIC APPARATUS. MAR. 7, 1972. CAN. 0913355, GRB. 1337146, JAP. 0759478.
3,654,654.—CLEANING APPARATUS. APR. 11, 1972. CAN. 0925257, GRB. 1335850, JAP. 0791054.
3,673,632.—CLEANING APPARATUS. JULY 4, 1972.
3,681,064.—PHOTELCTROPHRTC IMNG PROCS EMPLYNG MULTI-COMPNT ELCTRCLY PHOTOSNTV PARTICLE. AUG. 1, 1972.
3,685,897.—PHOTOELECTROPHORETIC APPARATUS USING PYRAMID GEARS. AUG. 22, 1972. CAN. 0957542.
3,687,109.—MATERIALS APPLICATION APPARATUS. AUG. 29, 1972. CAN. 0915907, GRB. 1337148.
3,697,167.—OPTICAL PROJECTION APPARATUS. OCT. 10, 1972. BEL. 0772913, CAN. 0955090. FRA. 7134731, GRB. 1316023, ITL. 0936735.
3,703,459.—LIQUID APPLICATOR. NOV. 21, 1972.
3,718,393.—IMAGING APPARATUS. FEB. 27, 1973.
3,722,993.—MATERIALS APPLICATION APPARATUS. MAR. 27, 1973.
3,730,620.—FOCUSING METHOD. MAY 1, 1973.
3,737,221.—ROTATIONAL DRIVE MECHANISM. JUNE 5, 1973.
3,744,897.—TRANSPARENT ELECTRODE FOR ELECTROPHORETIC IMAGING. JULY 10, 1973.
3,769,850.—PHOTOELECTROPHORETIC APPARATUS USING PYRAMID GEARS. NOV. 6, 1973.
3,776,628.—PHOTOELECTROPHORETIC IMAGING SYSTEM. DEC. 4, 1973.
3,784,294.—IMAGE DENSITY CONTROL. JAN. 8, 1974.
3,840,299.—PHOTOELECTROPHORETIC IMAGING APP FOR VARYING ADVANCING RATE OF VELOCITY OF ROLLER ELECTRODES. OCT. 8, 1974.
3,844,651.—PHOTELCTRPHRTC IMG APP FOR CONTRLNG TIME INTRVL OF SUCSSV ROLLR ELCTRDS LEAVNG AND ENTERNG IMG RE. OCT. 29, 1974.
3,920,330.—ELECTROPHORETIC IMAGING APPARATUS. NOV. 18, 1975. BEL. 0777719, CAN. 0961334, FRA. 7201005, GRB. 1376241, ITL. 0946357.
3,944,353.—BACKGROUND REDUCTION. MAR. 16, 1976.
3,950,640.—LAMP CONTROL AND LAMP SWITCH CIRCUIT FOR CONTROLLING LIGHT BALANCE. APR. 13, 1976.
3,952,700.—LIQUID APPLICATOR. APR. 27, 1976.
3,954,465.—ELECTROPHORETIC IMAGING METHODS. MAY 4, 1976. BEL. 0777719, CAN. 0961334, FRA. 7201005, GRB. 1376241, ITL. 0946357.
3,957,510.—OVERFLOW PREVENTION FOR LIQUID BETWEEN FLEXIBLE LAYERS ON A SOLID SURFACE. MAY 18, 1976.
3,981,459.—PHOTOELECTROPHORETIC ELECTROSTATIC TACKING CAPSTAN WEB TENSION SYS. SEPT. 21, 1976.
3,982,710.—PHOTOELECTROPHORETIC WEB TENSION SYSTEM. SEPT. 28, 1976.
3,985,434.—PHOTOELECTROPHORETIC PIGMENT DISCHARGING WITH AC COROTRON OR UV ILLUMINATION. OCT. 12, 1976.
3,989,366.—PHOTOELECTROPHORETIC IMAGING APPARATUS HAVING A DEVICE FOR INCREASING THE FRICTION FORCE BETWEE. NOV. 2, 1976. BEL. 0841080.

3,989,367.—APPARATUS FOR CONTACTING A ROLLER TO A SURFACE TO BE CONTACTED. NOV. 2, 1976.
3,991,992.—PHOTOELECTROPHORETIC WEB MACHINE SERVO DRIVE SYSTEM. NOV. 16, 1976. BEL. 0841079.

Class 12I

3,681,064.—PHOTELCTROPHRTC IMNG PROCS EMPLYNG MULTI-COMPNT ELCTRCLY PHOTOSNTV PARTICLE. AUG. 1, 1972.
3,820,987.—PHOTOELECTROPHORETIC IMAGING WITH FIXING ON A SEPARATE ELECTRODE. JUNE 28, 1974.

Class 12J

3,642,364.—TRANSFER APPARATUS. FEB. 15, 1972. AUS. 0455718, BEL. 0758808, CAN. 0918412, CZC. 0164906, EGR. 0087486, FRA. 7041650, GRB. 1336720, HUN. 0169308, ITL. 0909310, PLD. 0082862, SPN. 0385456, STZ. 0518581, USR. 0406387.
3,791,823.—PHOTOELECTROPHORETIC IMAGING TRANSFER METHOD. FEB. 12, 1974.
3,861,911.—IMAGING FIXING METHOD. JAN. 21, 1975.
3,897,143.—IMAGING SYSTEM. JULY 29, 1975.

Class 12K

3,510,419.—PHOTOELECTROPHORETIC IMAGING METHOD. MAY 5, 1970. ARG. 0165519, AUS. 0425666, BEL. 0717829. CAN. 0876044, FRA. 0095234, GRB. 1242262, ITL. 0896927, JAP. 0657876, MEX. 0102064, PNM. 0001975, PRU. 0010174, VZL. 0023693.
3,561,864.—ELECTROPHORETIC COATING DEVICE. FEB. 9, 1971. ARG. 0174608, ATR. 0302815, AUS. 0447649, BEL. 0739544, CAN. 0890357, FRA. 6933095; GER. 1949861, GRB. 1277806, ITL. 0873705, JAP. 0686763, MEX. 0113013.
3,609,029.—MATERIALS APPLICATION APPARATUS. SEPT. 28, 1971. BEL. 0772565, CAN. 0953097, FRA. 7133987; GRB. 1366382, ITL. 0936510.
3,619,053.—PHOTOELECTROPHORETIC IMAGING SYSTEM. NOV. 9, 1971. GRB. 1324102, JAP. 0759477.
3,620,948.—PHOTOELECTROPHORETIC IMAGING SYSTEM EMPLOYING PRELIMINARY ELECTROPHRIC DSPSTN OF IMAGNG SUSPENS. NOV. 16, 1971. ATR. 0326480, AUS. 0447819, BEL. 0739754, CAN. 0899137, FRA. 6933734, GRB. 1280027, HOL. 0146951, ITL. 0877872, JAP. 0709041, MEX. 0114889, SPN. 0372065, STZ. 0508232, SWD. 0341929, VZL. 0015070.
3,645,874.—IMAGE DENSITY CONTROL IN PHOTOELECTROPHORETIC IMAGING. FEB. 29, 1972. BEL. 0756899, CAN. 0922957, FRA. 7035803, GRB. 1331621, ITL. 0908434, JAP. 0743836.
3,658,687.—APPARATUS FOR FORMING IMAGES WITH APPLICATOR SHEARING SMOOTHING AND CLEANING MEANS. APR. 25, 1972. CAN. 0916433, GRB. 1337149, JAP. 0751881.
3,695,755.—PHOTOELECTROPHORETIC CAMERA. OCT. 3, 1972. CAN. 0958580, GRB. 1359694.
3,744,896.—IMAGING SYSTEM. JULY 10, 1973.
3,769,009.—INKING SYSTEM FOR LIQUID PARTICLE MIGRATION ON AUTOMATIC MACHINE. OCT. 30, 1973. HOL. 7216013.
3,938,088.—CHARACTER CODING AND RECOGNITION SYSTEM. FEB. 10, 1976.
3,944,353.—BACKGROUND REDUCTION. MAR. 16, 1976.
3,968,271.—COATING APPARATUS AND USE THEREOF. JULY 6, 1976.
3,993,020.—BLADE APPLICATOR ASSEMBLY. NOV. 23, 1976.
4,019,816.—COATING SYSTEM HAVING A COMPOSITE APPLICATOR ASSEMBLY PROVIDED WITH A RECIPROCATING BLADE. APR. 26, 1977.

Class 12L

3,622,691.—HIGH SPEED LIGHT RESPONSIVE TRANSFORM COMPUTER FOR A LIGHT-SENSITIVE PRINTING SYSTEM. NOV. 23, 1971. CAN. 0915813, GRB. 1335222, JAP. 0774709.
3,649,515.—PHOTOGRAPHIC MASKING SYSTEM. MAR. 14, 1972. CAN. 0936733, GRB. 1349610, JAP. 0774711.
3,715,209.—ELECTRICAL COLOR MASKING FOR A PHOTOELECTROPHORETIC IMAGING PROCESS. FEB. 6, 1973. BEL. 0763539, CAN. 0938491, FRA. 7107557. GRB. 1347139, ITL. 0918979, JAP. 0752723, MEX. 0120935.
3,810,758.—PHOTOGRAPHIC MASKING SYSTEM. MAY 14, 1974.

Class 12M

RE.27,117.—METAL FREE PHTHALOCYANINE IN THE NEW X-FORM-RE OF 3,357,989-D1170. APR. 20, 1971.
3,384,632.—ARYLAZO-4-ISOPROPOXY-1-NAPHTHOL COMPOUNDS. MAY 21, 1968. BEL. 0743897, CAN. 0787920, FRA. 1473703, GER. 1644400, GRB. 1145374, ITL. 0764015, JAP. 0578398.
3,402,177.—SUBSTITUTED 1-CYANO-2, 3-PHTHALOYL-7, 8-BENZOPYRROCOLINES. SEPT. 17, 1968. AUS. 0435189, BEL. 0743896, CAN. 0812820, GRB. 1145373.
3,432,415.—ELECTROPHORETIC IMG. PROCESS USING PHOTOSENSITIVE XANTHENONIUM SALTS. MAR. 11, 1969. AUS. 0439502, BEL. 0743895, CAN. 0851118, GER. 1522701, GRB. 1155747, JAP. 0650631, MEX. 0104632.
3,442,781.—PHOTOELECTROPHORETIC AND XEROGRAPHIC IMG. PROC. EMPL. TRIPHENODLOXAZINES AS ELECTRIC. PHOTOSENSIT. MAY 6, 1969. AUS. 0445582, BEL. 0743894, CAN. 0855152, GRB. 0175452, JAP. 0611634.
3,445,227.—ELECTROPHOTOGRAPHIC IMAGING PROCESSES EMPLOYING 2,4 DIAMINOTRIAZINES AS ELCTRCLY PHOTOSNSTV PRT. MAY 20, 1969. BEL. 0743891, CAN. 085268' GER. 1522687, GRB. 1146019, JAP. 0617789.
3,447,922.—ELECTRICALLY PHOTOSENSITIVE PARTICLES USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROC. JUNE 3, 1969.
3,448,028.—N-SBSTUD-8,13-DIOXODINAPHTHO-2-1-B,2,3-D-FURAN-6-CARBOXAMIDES AS ELCTLY PTOSNSTV MTLS IN ELCPHG. JUNE 3, 1969.
3,448,029.—ELECTROPHORETIC IMAGING PROCESS USING 8,13-DIOXODINAPHTO-2,1-B,2,3-D-FURAN-6-CARBOXAMIDE PIGMEN. JUNE 3, 1969.
3,448,030.—ELECTRICALLY PHOTOSENSITIVE PART. USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROCESSE. JUNE 3, 1969. AUS. 0445639, BEL. 0743893, CAN. 0943830, GRB. 1155554, JAP. 0686735.
3,474,020.—PHOTOELECTROPHORETIC IMAGING PROCESS USING QUINACRIDONES. OCT. 21, 1969. ARG. 0154377, AUS. 0414491, BEL. 0683405, CAN. 0834673, FRA. 0090574, GRB. 1155403, ITL. 0842587, JAP. 0601872, MEX. 0088935, SPN. 0328503, SWD. 6608734, VZL. 0023989.
3,478,064.—1,5-BIS-SUBSTITUTED ALKYLAMINO-ANTHRAQUINONES. NOV. 11, 1969. ARG. 0145636, AUS. 0419687, BEL. 0683222, CAN. 0880309, FRA. 1484968, GRB. 0155985, ITL. 0771955, JAP. 0581828, MEX. 0092775, SPN. 0328428, STZ. 0461273, SWD. 0328188, VZL. 0021224.
3,485,633.—ELECTROPHORETIC IMG PROC EMPL METALLIC LAKES OF FLUORESCEIN DERIVATIVES AS ELECTRICLY PHOTOSENS. DEC. 23, 1969. AUS. 0444394, BEL. 0743641, CAN. 0848386, GER. 1572387, GRB. 1190965, JAP. 0586923.
3,492,308.—PROCESS FOR PREPARING METAL FREE PHTHALOCYANINES - SYNTHESIS OF METAL-FREE PHTHALOCYANINE. JAN. 27, 1970. CAN. 0922708, GRB. 1216887, JAP. 0586926.
3,492,309.—SYNTHESIS OF ALPHA METAL-FREE PHTHALOCYANINE. JAN. 27, 1970. CAN. 0894803, GRB. 1206306, JAP. 0604155.
3,531,309.—COMPOSITIONS COMPRISING 1-CYANO-2,3-PHTHALOYL-7,8-BENZOPYRROCOLINES AND A CARRIER. SEPT. 29, 1970.
3,546,085.—PHOTOELECTROPHORETIC IMAGING PROCESS AND SUSPENSION. DEC. 8, 1970. BEL. 0710052, CAN. 0875493, FRA. 1568088, GER. 1622380, GRB. 1208812, ITL. 0823929, JAP. 0594741.
3,560,360.—PHOTOELECTROPHORETIC IMAGING PROCESS AND ANTHRAQUINONES AS THE ELECTRICALLY PHOTOSENSITIVE PARTIC. FEB. 2, 1971. CAN. 0850590, MEX. 0096584.
3,562,248.—BISAZO PGMTS DRVD CPLRS OBTD CONDG 8-AMINO-2-NAPHTHOLS W/ DICARBOXYLIC ACID CHLORIDES. FEB. 9, 1971. ATR. 0302037, AUS. 0435392, BEL. 0743422, CAN. 0889836, FRA. 6944290, GER. 1717183, GRB. 1217905, ITL. 0879047, JAP. 0608727.
3,574,182.—CALCIUM SALT OF 6-BROMO-1-1-SULFO-2-NAPHTHYLAZO-2-NAPHTHOL. APR. 6, 1971. ARG. 0168131, ATR. 0302812, AUS. 0429649, BEL. 0710053, CAN. 0878483, CHL. 0024254, CLB. 0018785, DNK. 0128493, FIN. 0049711, FRA. 1556484. GRB. 1197374, GRK. 0036648, IND. 0114221, ISR. 0029376, ITL. 0823989, JAP. 0605213, LXB. 0055364, MEX. 0099564, NOR. 0129593, NZL. 0151403, PRU. 0009483, PTG. 0049036, SAF. 0068559, SPN. 0349965, STZ. 0524844, SWD. 0351737, URG. 0008893, VZL. 0032776.

3,594,163.—METHOD OF CONVERTING ALPHA PHTHALOCYANINE TO THE X FORM. JULY 20, 1971.

3,615,558.—PHOTOLECTROPHORETIC IMAGING PROCESS EMPLOYING A FINELY-DIVIDED PHTHALOCYANINE PIGMENT. OCT. 26, 1971. CAN. 0850022.

3,616,393.—PHOTOELECTROPHORETIC IMAGING PROCESS EMPLOYING A PIGMENT HAVING THE FORMULA RNS. OCT. 26, 1971.

3,634,221.—PIGMENT RECLAIMING. JAN. 11, 1972. BEL. 0744760, CAN. 0921427, FRA. 7001822, GRB. 1301382, ITL. 0886625.

3,635,981.—PHOTOELECTROPHORETIC IMAGING PIGMENT COMPOSITION AND PROCESS. JAN. 18, 1972. ARG. 0193337, ATR. 0305459, AUS. 0448778, BEL. 0741064, CAN. 0953143, FRA. 6937772, GER. 1955001, GRB. 1285610, ITL. 0879711, JAP. 0685461, MEX. 0114879.

3,645,883.—PHTELCTRPHRTC IMGNG APRTUS EMPLYNG PHTSNSTV PRTCLS EXHBTG FATIGUE CHARACTERISTICS. FEB. 29, 1972.

3,652,438.—PHTELCTRPHRTC IMGNG PROCS USNG DIVLNT HVY MTL SLT OR 1-1-SULFO-2-NAPHYLZO-2-NAPHLS AS IMGNG MAT. MAR. 28, 1972.

3,658,675.—PHOTOELECTROPHORETIC IMAGING PROCESS USING BISAZO PIGMENTS. APR. 25, 1972.

3,692,517.—PHOTOELECTROPHORETIC IMAGING PROCESS EMPLOYING AN INSULATING CARRIER LQD CNTNG UNSATURATED COMP. SEPT. 19, 1972. ARG. 0164485, AUS. 0430397, BEL. 0715670, CAN. 0913968, FRA. 1563583, GER. 1772522, GRB. 1225316, ITL. 0834948, JAP. 0641521, MEX. 0100255, VZL. 0032921.

3,705,901.—PHOTOELECTROPHORETIC IMAGING COMPOSTION. DEC. 12, 1972.

3,753,708.—PHOTOELECTROPHORETIC IMAGING PROCESS EMPLOYING QUINACRIDONE PIGMENTS. AUG. 21, 1973.

3,758,305.—PHOTOELECTROPHORETIC IMAGING PROCESS. SEPT. 11, 1973.

3,825,422.—IMAGING PROCESS. JULY 23, 1974. CAN. 0984201, GRB. 1442667.

3,867,141.—PHOTOELCTRC AND ELCTRPHOTGRPHC PGMNTS COMPRISNG DERIVATIVS OF CNDNSD PLYCLC AROMTC HYDROCRBN ALDE. FEB. 18, 1975.

3,922,169.—PHOTOELECTRIC AND ELECTROPHOTOGRAPHIC PIGMENTS COMPRISING DERIVATIVES OF CONDENSED POLYCYCLIC A. NOV. 25, 1975.

3,923,506.—PHOTOELECTRIC AND ELECTROPHOTOGRAPHIC PIGMENTS COMPRISING DERIVATIVES OF CONDENSED POLYCYCLIC A. DEC. 2, 1975.

3,953,462.—IMAGING PROCESS. APR. 27, 1976. ARG. 0202139, BEL. 0821400, GRB. 1467999.

3,957,829.—CERTAIN DINAPHTHO (1,2-B;2',3'-D)-FURAN-7,12 DIONES. MAY 18, 1976.

4,012,252.—IMAGING PROCESS UTILIZING 3-BROMO-N-2''-PYRIDYL-8,13-DIOXODIMAPHTHO-(2,1-; 3',3'-)-FURON-6-CARBO. MAR. 15, 1977. ARG. 0202139, BEL. 0821400, GRB. 1467999.

4,017,311.—PHOTOELECTROPHORETIC IMAGING SUSPENSION. APR. 12, 1977.

4,032,339.—PHOTOSENSITIVE COMPOSITION CONTAINING VANADYL PHTHALOCYANINE FOR PHOTOELECTROPHORECTIC IMAGING. JUNE 28, 1977.

Class 12N

3,446,722.—ELECTROPHORETIC REFINING OF PHOTOSENSITIVE PARTICLES. MAY 27, 1969. AUS. 0424699, BEL. 0743903, CAN. 0840368. GER. 1622-76, GRB. 1189636.

3,473,940.—PREPARATION OF PHOTOELECTROPHORETIC IMAGING SUSPENSION. OCT. 21, 1969. BEL. 0743899, CAN. 0847808, FRA. 1524448, GER. 1572386, GRB. 1161780, ITL. 0794432, JAP. 0594583, MEX. 0097623.

3,477,934.—IMAGING PROCESS. NOV. 11, 1969. ARG. 0158372, AUS. 0416251, BEL. 0700645, CAN. 0850023, FRA. 1550998, GRB. 1196044, ITL. 0804665, JAP. 0725097, MEX. 0098737, SPN. 0342376, STZ. 0481408, SWD. 0336525, VZL. 0021263.

3,551,313.—IMAGE CONTRAST CONTROL IN PHOTOELECTROPHORETIC IMAGING - PHAROS CONTRAST CONTROL. DEC. 29, 1970. ATR. 0302814, AUS. 0448317, BEL. 0738218, CAN. 0899689, FRA. 6929449, GER. 1944510, GRB. 1274525, ITL. 0871538, JAP. 0708365, SWD. 0341130.

3,553,093.—COLOR PHOTOELECTROPHORETIC IMAGING PROCESS. JAN. 5, 1971. ATR. 0286783, AUS. 0416331, BEL. 0692911, CAN. 0818388, FRA. 1471745, GER. 1522743, GRB. 1149665, IND. 0104183, ISR. 0025304. ITL. 0762674, JAP. 0608337, MEX. 0089790, NOR. 0123368, NZL. 0144531, STZ. 0479099, SWD. 0334540.

3,586,615.—PHOTOELECTROPHORETIC IMAGING PROCESS INCLUDING THE USE OF AN ELECTRICALLY CHRGD SUSPNSN COATNG. JUNE 22, 1971. BEL. 0743921, CAN. 0891972, FRA. 6945567, GER. 1965460, GRB. 1284429, HOL. 1284429, ITL. 0880418, JAP. 0729281.

3,595,770.—SEQUENTIAL PHOTOELECTROPHORETIC IMAGING SYSTEM. JULY 27, 1971. ARG. 0176384, ATR. 0299697, AUS. 0429715, BEL. 0722300, BRA. 0087996, CAN. 0891970, CHL. 0024332, DNK. 0126879, FRA. 1589548, GRB. 1239259, ITL. 0845021, LXB. 0057101, MEX. 0103850, NZL. 0154114, PNM. 0001418, PTG. 0050485, SAF. 0686705, SPN. 0359239, STZ. 0496265, SWD. 0339172, URG. 0009317, VZL. 0023705.

3,601,483.—IMAGING APPARATUS. AUG. 24, 1971.

3,607,256.—FULLY-ENCLOSED ELECTROPHORETIC IMAGING SYSTEM. SEPT. 21, 1971.

3,616,390.—ELECTROPHORETIC IMAGING METHOD CHARACTERIZED BY EXPOSURE OF ELECTRCLY PHOTSNSTV PRTCLS AT LIQUI. OCT. 26, 1971. ATR. 0322980, AUS. 0448380. BEL. 0743423, CAN. 0890356, FRA. 6944288, GER. 1947105, GRB. 1249546, ITL. 0879048, JAP. 0688351.

3,616,395.—PHOTOELECTROPHORETIC IMAGING WITH CORONA FIELD APPLICATION. OCT. 26, 1971. CAN. 0922142, GRB. 1318565, JAP. 0756962.

3,620,950.—ELECTROPHORETIC IMAGING EMPLOYING PERIODIC ELECTROMAGNETIC RADIATION. NOV. 16, 1971. ATR. 0302045, AUS. 0449606, BEL. 0739750, CAN. 0887022, FRA. 5934262, GRB. 1283384, ITL. 0877875, JAP. 0718339.

3,634,221.—PIGMENT RECLAIMING. JAN. 11, 1972. BEL. 0744760, CAN. 0921427, FRA. 7001822, GRB. 1301382, ITL. 0886625.

3,642,598.—PHOTOELECTROPHORETIC IMAGING METHOD AND APPARATUS. FEB. 15, 1972. ARG. 0188632, BEL. 0756481, CAN. 0922144, FRA. 7034709, GRB. 1324105, ITL. 0908073, JAP. 0740359, MEX. 0115601, VZL. 0032786.

3,645,874.—IMAGE DENSITY CONTROL IN PHOTOELECTROPHORETIC IMAGING. FEB. 29, 1972. BEL. 0756899, CAN. 0922957, FRA. 7035803, GRB. 1331621, ITL. 0908434, JAP. 0743836.

3,645,883.—PHTELCTRPHRTC IMGNG APRTUS EMPLYNG PHTSNSTV PRTCLS EXHBTG FATIGUE CHARACTERISTICS. FEB. 29, 1972.

3,647,659.—PHTELCTRPHRTC IMGNG PRCS WHEREIN IMGNG ELCTRCL FLD APPLD SUBSEQUENT TO IMAGE WISE EXPOSURE. MAR. 7, 1972. BEL. 0772912, CAN. 0958581, FRA. 7134730, GRB. 1354798, ITL. 0936734.

3,657,091.—ELECTROPHORETIC IMAGING METHOD EMPLOYING A PERIODIC ELECTRIC FIELD. APR. 18, 1972. ARG. 0174612, ATR. 0302816, AUS. 0448524, BEL. 0739752, CAN. 0913970, FRA. 6933735, GRB. 1282469, ITL. 0889439, JAP. 0709039, MEX. 0114739.

3,663,396.—KINESCOPE PHOTOELECTROPHORETIC IMAGING METHODS AND SYSTEMS. MAY 16, 1972. ARG. 0196858, BEL. 0762417, CAN. 0935965, FRA. 7104350, GRB. 1345571, ITL. 0918121, JAP. 0743838, MEX. 0131834.

3,664,941.—PHTELCTRPHRTC REVERSAL IMGNG USNG SUSPENSION CONTAINING VITAMIN PRECURSOR, B-CAROTENE. MAY 23, 1972.

3,666,472.—ELECTROPHORETIC IMAGING COMPOSITION - IMPROVEMENT OF PHAROS POLYCHROME IMAGING SYSTEM. MAY 30, 1972. ATR. 0302042, AUS. 0455711, BEL. 0739753, CAN. 0899138, FRA. 6933736, GRB. 1279284, HOL. 0147548, ITL. 0889440, JAP. 0709040, MEX. 0116450.

3,669,872.—IMAGING SYSTEM. JUNE 13, 1972.

3,676,313.—REMOVING UNDESIRED POTENTIAL FROM BLOCKING ELECTRODE IN A PHOTOELECTROPHORETIC IMAGING SYSTEM. JULY 11, 1972.

3,681,221.—PHOTOELECTROPHORETIC IMAGING BY PHOSPHORESCENCE. AUG. 1, 1972. CAN. 0935013, GRB. 1348121.

3,696,020.—ELECTROPHORETIC IMGNG APRTS INCLUDING MEANS TO COAT AND ELCTRFY IMGNG ELCTRODE. OCT. 3, 1972.

3,723,288.—ELECTROPHORETIC IMAGING APPARATUS INCLUDING MEANS TO PROJECT AN IMAGE AT A LIQUID NIP. MAR. 27, 1973.

3,737,310.—BACKGROUND REDUCTION. JUNE 5, 1973.

3,741,639.—PHOTOELECTROPHORETIC IMAGING BY PHOSPHORESCENCE. JUNE 26, 1973.
3,741,760.—IMAGING SYSTEM. JUNE 26, 1973.
3,748,035.—METHOD FOR SEQUENTIAL ILLUMINATION IN A POLYCHROME PROCESS. JULY 24, 1973. CAN. 0960288, GRB. 1416328.
3,772,013.—PHOTOELECTROPHORETIC IMAGING PROCESS EMPLOYING ELECTRICALLY PHOTOSENSITIVE PARTICLES AND INERT PA. NOV. 13, 1973. ARG. 0196295, ATR. 0327682, BEL. 0777724, CAN. 0957543, FRA. 7200998, GRB. 1370026, ITL. 0946356, JAP. 0759477, MEX. 0124561, SPN. 0398586, SWD. 0367075, VZL. 30687.
3,782,932.—ELECTROPHORETIC IMAGING PROCESS USING TRANSPARENT PARTICLES. JAN. 1, 1974. ATR. 0302043, AUS. 0446066, BEL. 0743424, CAN. 0913441, FRA. 6944289, GER. 1949149, GRB. 1280900, ITL. 0897053. JAP. 0699518.
3,785,816.—ELIMINATING CORONA ARCING IN PHOTOELECTROPHORETIC IMAGING. JAN. 15, 1974.
3,787,206.—PHOTOELECTROPHORETIC IMAGING METHOD INCLUDING AT LEAST ONE ELECTRODE CARRYING A PATTERN. JAN. 22, 1974.
3,801,195.—ELECTROPHORETIC IMAGING. APR. 2, 1974. ARG. 0174613, ATR. 0293874, AUS. 0455712, BEL. 0739747, CAN. 0922141, FRA. 6933738, GER. 1949416, GRB. 1279285, HOL. 0146950, ITL. 0877873, JAP. 0709042, MEX. 0108820.
3,804,620.—METHOD OF PRODUCING PLANOGRAPHIC PLATES BY PHOTOELECTROPHORETIC IMAGING. APR. 16, 1974.
3,811,764.—APPARATUS FOR PHOTOELECTROPHORETIC IMAGING USING A PERIODIC ELECTRIC FIELD. MAY 21, 1974.
3,850,627.—ELECTROPHORETIC IMAGING METHOD. NOV. 26, 1974. BEL. 0777719, FRA. 7201005, GRB. 1376241, ITL. 0946357.
3,857,549.—PHOTOELECTROPHORETIC IMAGING APPARATUS. DEC. 31, 1974.
3,857,707.—PHOTOELECTROPHORETIC IMAGING PROCESS USING DRY PIGMENT COATED SUBSTRATE. DEC. 31, 1974.
3,881,920.—PHOTOELECTROPHORETIC IMAGING PROCESS. MAY 6, 1975.
3,901,701.—PHOTOELECTROPHORETIC IMAGING PROCESS USING PHOTOCONDUCTIVE ELECTRODE WHICH ALTERS SPECTRAL RESPONSE. AUG. 26, 1975.
3,905,812.—IMAGING PROCESS. SEPT. 16, 1975. FRA. 7413994, GRB. 1443121.
3,920,330.—ELECTROPHORETIC IMAGING APPARATUS. NOV. 18, 1975. BEL. 0777719, CAN. 0961334, FRA. 7201005, GRB. 1376241, ITL. 0946357.
3,933,487.—IMAGING COMPOSITION FOR PHOTOELECTROPHORETIC IMAGING SYSTEM. JAN. 20, 1976. CAN. 0973005, GRB. 1375941.
3,954,465.—ELECTROPHORETIC IMAGING METHODS. MAY 4, 1976. BEL. 0777719, FRA. 7201005, GRB. 1376241, ITL. 0946357.
3,961,949.—PHOTOELECTROPHORETIC IMAGING METHOD PRODUCING A DESIRED IMAGE BORDER. JUNE 8, 1976.
3,967,960.—PHOTOELECTROPHORETIC IMAGING PROCESS EMPLOYING DARK CHARGE INJECTING ELEMENT. JULY 6, 1976.
4,023,968.—PHOTOELECTROPHORETIC COLOOR IMAGING PROCESS IN WHICH BACK MIGRATION IS ELIMINATED. MAY 17, 1977.

Class 12O

3,647,660.—PHOTOELECTROPHORETIC IMAGING METHOD EMPLOYING A HALOGEN CONTAINING SUSPENSION. MAR. 7, 1972.
3,869,286.—PHOTOELECTROPHORETIC IMAGING WITH COPPER-FREE CHLOROPHYLL IN THE CARRIER LIQUID. MAR. 4, 1975.

Class 12P

RE.28,260.—ELECTROPHORETIC IMAGING PROCESS INCLUDING APPL OF DYNAMIC STRESS ON THE PARTICLE SUSPENSION. DEC. 3, 1974. ARG. 0174614, ATR. 0302044, AUS. 0448318, BEL. 0739748, CAN. 0890358, FRA. 6934260, GER. 1949148, GRB. 1282736, HOL. 0146301, ITL. 0877874, JAP. 0718340, MEX. 0108886.
3,595,772.—METHOD OF BREAKING PARTICLE AGGLOMERATES IN THE PHOTO-ELECTROPHORETIC IMAGING SYSTEM. JULY 27, 1971. ARG. 0176808, ATR. 0293875, AUS. 0445175, BEL. 0739749, CAN. 0912398, FRA. 6934261, GRB. 1290370, ITL. 0887503, JAP. 0712831, MEX. 0127747.
3,616,391.—ELECTROPHRTC IMGNG PRCSS INC APPLCTN OF DYNAMIC STRESS ON PARTCL SUSPSN-REISSUED D 2177R. OCT. 26, 1971. ARG. 0174614, ATR. 0302044, AUS. 0448318, BEL. 0739748, CAN. 0890358, FRA. 6934260, GER. 1949148, GRB. 1282736, HOL. 0146301, ITL. 0877874, JAP. 0718340, MEX. 0108886.
3,666,472.—ELECTROPHORETIC IMAGING COMPOSITION - IMPROVEMENT OF PHAROS POLYCHROME IMAGING SYSTEM. MAY 30, 1972. ATR. 0302042, AUS. 0455711, BEL. 0739753, CAN. 0899138, FRA. 6933736, GRB. 1279284, HOL. 0147548, ITL. 0889440, JAP. 0709040, MEX. 0116450.
3,743,404.—PHTOELECTROPHORETIC IMGNG APPTS INCNG MEANS TO SIMULTNUSLY APPLY COMPRSVE STRESS AND SHEAR TO IMGNG. JULY 3, 1973.
3,784,302.—ELECTROPHORETIC IMAGE APPARATUS INCLUDING APPLICATION OF DYNAMIC STRESS ON THE PARTICLE SUSPENS. JAN. 8, 1974.
3,833,493.—IMAGING PROCESS. SEPT. 3, 1974.
3,943,049.—APPARATUS FOR SEPARATING AGGLOMERATED PARTICLES WITH SUSPENSION. MAR. 9, 1976.

Class 12Q

3,642,364.—TRANSFER APPARATUS. FEB. 15, 1972. AUS. 0455718, BEL. 0758808, CAN. 0918412, CZC. 0164906, EGR. 0087486, FRA. 7041650, GRB. 1336720, HUN. 0169308, ITL. 0909310, PLD. 0082862, SPN. 0385456, STZ. 0518581, USR. 0406387.
3,655,370.—PHOTOELECTROPHORETIC IMAGE TRANSFER. APR. 11, 1972.
3,705,797.—FIXING PROCESS FOR PHOTOELECTROPHORETIC IMAGING. DEC. 12, 1972.
3,711,196.—IMAGE TRANSFER. JAN. 16, 1973.
3,791,823.—PHOTOELECTROPHORETIC IMAGING TRANSFER METHOD. FEB. 12, 1974.
3,804,508.—PHOTOELECTROPHORETIC APPARATUS FOR HEAT FACING AN IMAGE. APR. 16, 1974.
3,897,143.—IMAGING SYSTEM. JULY 29, 1975.

Class 12R

3,574,614.—PROCESS OF PREPARING MULTIPLE COPIES FROM A XEROPRINTING MASTER. APR. 13, 1971. ATR. 0305769, AUS. 0448396, BEL. 0743660, CAN. 0882599, FRA. 6944513, GRB. 1209060, ITL. 0899118, JAP. 0710908.
3,607,256.—FULLY-ENCLOSED ELECTROPHORETIC IMAGING SYSTEM. SEPT. 21, 1971.
3,682,628.—PHOTOELECTROPHORETIC FACSIMILE TRANSMISSION. AUG. 8, 1972. CAN. 0957889, GRB. 1365163.
3,800,302.—RECORDING OSCILLOGRAPH UTILIZING PHOTOELECTROPHORETIC TECHNIQUES. MAR. 26, 1974.
3,849,132.—PHOTOELECTROPHORETIC IMAGING METHOD EMPLOYING A CHROMOGENIC REACTION. NOV. 19, 1974. BEL. 0809399, GRB. 1447104.
3,938,088.—CHARACTER CODING AND RECOGNITION SYSTEM. FEB. 10, 1976.

Class 15

3,693,517.—PRINTING APPARATUS—KALEIDOSCOPE PRINTER WITH CIRCUMFERENTIAL STRIPS. SEPT. 26, 1972. CAN. 0948265, GRB. 1330327.
3,801,319.—IMAGING METHOD UTILIZING CHEMICAL REACTIVITIES OF PHOTOEXCITED STATES OF AROMATIC HYDROXY COMPO. APR. 2, 1974. CAN. 1000549, GRB. 1429501.
3,847,644.—IMAGING BY PHASE AGGREGATION FROM BLOCK COPOLYMERS. NOV. 12, 1974.
3,851,584.—CHEMICAL REPRODUCTION SYSTEMS. DEC. 3, 1974.
3,888,670.—IMAGING METHOD. JUNE 10, 1975.
3,915,706.—IMAGING SYSTEM BASED ON PHOTODEGRADABLE POLYALDEHYDES. OCT. 28, 1975.
3,923,514.—METHOD FOR THE PREPARATION OF RELIEF PRINTING MASTERS. DEC. 2, 1975.
3,929,477.—IMAGE PRODUCING TECHNIQUES OF SUPERCONDUCTING MATERIAL IN A MAGNETIC FIELD. DEC. 30, 1975.

3,930,858.—HEAT DEVELOPMENT PROCESS UTILIZING A PHOTOSENSITIVE COMPOSITION CONTAINING A HALOGENATED POLYME. JAN. 6, 1976.
3,963,491.—IMAGING METHOD. JUNE 15, 1976.
3,986,874.—DRIOGRAPHIC IMAGING METHOD. OCT. 19, 1976.
3,990,043.—CHARACTER CODING AND RECOGNITION SYSTEM. NOV. 2, 1976.
4,009,466.—CHARACTER CODING AND RECOGNITION SYSTEM. FEB. 22, 1977.
4,032,980.—RECORDED MAGNETIC MEMBER VIEWING APPARATUS. JUNE 28, 1977.

Class 15A

3,320,060.—DEFORMATION IMAGE REPRODUCTION PROCESS UTILIZING A VOLTAGE THRESHOLD REDUCING SURFACTANT. MAY 16, 1967. CAN. 0807325, FRA. 1416119, GER. 1261867, GRB. 1097919, ITL. 0739830, JAP. 0519668.
3,338,710.—FROST THERMOGRAPHY. AUG. 29, 1967.
3,404,001.—THERMOPLASTIC DEFORMATION IMAGING WITH COLOR REAGENTS. OCT. 1, 1968. CAN. 0801265, FRA. 1459100, GER. 1497214, GRB. 1124925, ITL. 0725974, JAP. 0529727.
3,615,387.—STRIPPABLE LAYER RELIEF IMAGING PROCESS. OCT. 26, 1971. CAN. 0887033.
3,697,184.—APPARATUS FOR EVALUTING THE RECORDING CHARACTERISTICS OF A THERMOPLASTIC PHOTORECEPTOR. OCT. 10, 1972. CAN. 1083484, GRB. 1389471.
3,715,207.—ELCTRSTCLY DEFORMABLE THERMOPLASTIC LAYER CONTAINING A 1,4-DIALKYLAMINO-9, 10-ANTHRAQUINONE DYE. FEB. 6, 1973.
3,729,310.—SURFACE DEFORMABLE IMAGING PROCESS AND MEMBER. APR. 24, 1973.
3,741,759.—FROST IMAGING PROCESS. JUNE 26, 1973.
3,795,514.—DEFORMATION IMAGING METHOD. MAR. 5, 1974.
3,869,612.—COPY APPARATUS WITH MEANS TO EFFECT VISIBLE RAY IMAGING AND INFRARED RAY TRANSFIXING. MAR. 4, 1975. STZ. 0032775.
3,893,416.—DEVELOPMENT AND CLEANING APP FOR REVERSE PATH MACHINE. JULY 8, 1975.
3,902,062.—REVERSE PATH IMAGING AND TRANSFIXING COPYING METHOD. AUG. 26, 1975. BEL. 0823656.
3,904,875.—SINGLE RADIATION RAY PATH FOR THERMOGRAPHIC IMAGING & TRANSFIXING OR FUSING. SEPT. 9, 1975. ARG. 0207128.
3,906,896.—INK APPLICATOR. SEPT. 23, 1975. CAN. 0974753.
3,908,125.—REVERSE PATH IMAGING AND TRANSFIXING COPYING MACHINE. SEPT. 23, 1975.
3,909,613.—COPYING METHOD AND APP WITH MEANS TO EFFECT VISIBLE RAY IMAGING AND INFRARED RAY TRANSFIXING OR FUS. SEPT. 30, 1975.
3,923,004.—DEVELOPMENT AND CLEANING APPARATUS FOR REVERSE PATH MACHINE. DEC. 2, 1975. BEL. 0823656.
3,932,025.—IMAGING SYSTEM. JAN. 13, 1976.
3,944,358.—COLOR IMAGE REPRODUCTION SYSTEMS. MAR. 16, 1976.
3,946,230.—COPY METHOD UTILIZING SINGLE RADIANT RAY PATH FOR IMAGING AND TRANSFIXING. MAR. 23, 1976.
3,949,160.—ELECTRO-OPTIC READ OUT OF THERMOPLASTIC DEFORMATION PATTERNS. APR. 6, 1976.
3,951,533.—COLOR IMAGE REPRODUCTION SYSTEM. APR. 20, 1976.
3,984,262.—METHOD OF MAKING A SUBSTRATE STRIPED PLANAR LASER. OCT. 5, 1976.
3,997,243.—COLOR IMAGE REPRODUCTION SYSTEM. DEC. 14, 1976.
4,023,969.—DEFORMABLE ELASTOMER IMAGING MEMBER EMPLOYING AN INTERNAL OPAQUE DEFORMABLE METALLIC LAYER. MAY 17, 1977.

Class 15B

3,350,205.—METHOD OF IMAGE REPRODUCTION BY PHOTOPOLYMERIZATION AND BLUSHING. OCT. 31, 1967. CAN. 0717934, GRB. 1095174, JAP. 0561238.
3,561,962.—METHOD OF IMAGE REPRODUCTION BY PHOTOPOLYMERIZATION AND BLUSHING. FEB. 9, 1971.
3,834,906.—LIGHT ACTIVATING IMAGING PROCESS. SEPT. 10, 1974.
3,885,963.—LIGHT ACTIVATING IMAGING PROCESS. MAY 27, 1975.
3,890,147.—LIGHT ACTIVATING IMAGING PROCESS. JUNE 17, 1975.
3,892,180.—LIGHT ACTIVATING IMAGING PROCESS. JULY 1, 1975.
3,892,570.—LIGHT ACTIVATING IMAGING PROCESS. JULY 1, 1975.

Class 15B 2

3,862,841.—POLYMERIZATION IMAGING BY CHARGE INJECTION FROM A PHOTOCONDUCTIVE LAYER. JAN. 28, 1975.

Class 15C

3,250,636.—MTD AND APTS IMAGE REPRODCTN W/USE OF REUSABLE HEAT DEMAGNETIZABLE FERROMAGNETIC IMAGING LAYER. MAY 10, 1966. CAN. 0711404, GRB. 1070986, JAP. 0487336.
3,526,191.—DUPLICATING PROCESS EMPLOYING MAGNETIC DEVELOPER MATERIAL. SEPT. 1, 1970. CAN. 0903830, GER. 1671576, GRB. 1208307.
4,014,065.—MAGNETIC DEVELOPER REMOVAL SYSTEM. MAR. 29, 1977.
4,030,104.—THERMO-MAGNETIC IMAGE TRANSFER APPARATUS. JUNE 14, 1977.
4,032,923.—THERMOMAGNETIC IMAGING APPARATUS. JUNE 28, 1977.
4,035,810.—MAGNETIC INTERPOSITIVE METHOD WITH ELECTROSTATIC IMAGING. JULY 12, 1977.
4,038,665.—DONOR TRANSFER OF MAGNETIC TONER. JULY 26, 1977.

Class 15D

3,441,410.—DEFORMATION IMAGING PROCESSES USING ELECTRICALLY PHOTOSENSITIVE PHOTOCHROMIC MATERIALS. APR. 29, 1969. CAN. 0801267, FRA. 1485348, GER. 1522696, GRB. 1156151, JAP. 0545759.
3,441,411.—IMAGE FORMATION THROUGH CHEMICAL REACTION OF PHOTOCHROMIC MATER. APR. 29, 1969. CAN. 0834676, GRB. 1165215.
3,442,646.—FRMATION OF LIGHT SCATTERING IMGS IN LAYERS COMPRSNG ORGANIC PHOTOCHROMIC MATERIALS. MAY 6, 1969. GRB. 1164484.
3,450,530.—PHOTOGRAPHIC IMAGING BY MEANS THE SURFACE TENSION CREATED BY PHOTOCHROMIC MATERIALS. JUNE 17, 1969.
3,450,531.—ADHESIVE IMAGING ON PHOTOCHROMIC LAYERS. JUNE 17, 1969.
3,450,533.—FORMATION OF LIGHT SCATTERING IMAGES IN PHOTOCHROMIC LAYERS. JUNE 17, 1969. CAN. 0875500.
3,451,811.—ELECTROPHOTOGRAPHIC IMAGING PROCESSES USING ELECTRICALLY PHOTOSENSITIVE PHOTOCHROMIC MATERIALS. JUNE 24, 1969. CAN. 0828692, JAP. 0573734.
3,471,290.—PHOTOCHROMIC PHOTORESIST IMAGING. OCT. 7, 1969.
3,482,973.—IMAGING SYSTEM. DEC. 9, 1969.
3,967,964.—PHOTOSENSITIVE FILM COPRINSING AN ORGANOSELENIUM AND AN ORGANSMERCURY. JULY 6, 1976.
3,973,966.—PHOTOCHROMIC COMPOSITION CONTAINING A DIPHENYL DIBENZOCHRON-3-ENE. AUG. 10, 1976.
4,007,372.—IMPROVED METHOD & ARTICLE FOR IMAGE REPRODUCTION. FEB. 8, 1977.

Class 15E

3,635,708.—VESICULAR IMAGING PROCESS. JAN. 18, 1972.
3,847,644.—IMAGING BY PHASE AGGREGATION FROM BLOCK COPOLYMERS. NOV. 12, 1974.

Class 15F

3,396,401.—APPARATUS AND METHOD FOR MARKING OF INTELLIGENCE ON A RECORD MEDIUM. AUG. 6, 1968.
3,671,237.—METHOD FOR PRODUCING IMAGES. JUNE 20, 1972. CAN. 0886492, GRB. 1317043.
3,753,705.—AGGLOMERATION IMAGING PROCESS USING HARDENABLE MATERIAL. AUG. 21, 1973. CAN. 0929350, GRB. 1330518.
4,029,502.—IMAGING SYSTEM CONTAINING AGGLOMERABLE MATERIAL. JUNE 14, 1977. ARG.

0172317, BEL. 0737813, CAN. 0884217, FRA. 6928725, GER. 1942380, GRB. 1286501, ITL. 0870234, SWD. 0340954.

Class 17A

3,909,609.—LIGHT SOURCE MEASURING APPARATUS. SEPT. 30, 1975.

Class 17A 1

2,774,887.—RADIATION SENSING DEVICE. DEC. 18, 1956.
3,445,660.—METHOD FOR DETECTION OF ULTRAVIOLET RADIATION. MAY 20, 1969.

Class 17A 2

3,330,700.—SOLAR-CELL PANELS. JULY 11, 1967.
3,359,137.—SOLAR CELL CONFIGURATION. DEC. 19, 1967.
3,513,040.—RADIATION RESISTANT SOLAR CELL. MAY 19, 1970.

Class 17A 3

3,351,493.—DIFFUSED RADIATION TRACKING TRANSDUCER HAVING A LATERAL PHOTO VOLTAGE JUNCTION. NOV. 7, 1967.
3,443,102.—SEMICONDUCTOR PHOTOCELL DETECTOR WITH VARIABLE SPECTRAL RESPONSE. MAY 6, 1969.

Class 17A 4

3,013,158.—LINEARIZATION OF LATERAL PHOTOCELLS. DEC. 12, 1961.
3,901,607.—HIGH APERTURE REFLECTION PHOTODETECTOR APPARATUS. AUG. 26, 1975.

Class 17B

2,021,884.—PHOTOGRAPHING APPARATUS. NOV. 26, 1935.
3,650,604.—INTER-FERAMETRIC SCANNING APPARATUS AND METHOD. MAR. 21, 1972. CAN. 0954354, GRB. 1363263.
3,650,605.—INTERFERAMETRIC APPARATUS WITH CONTROLLED SCANNING MEANS. MAR. 21, 1972. CAN. 0952749.
3,902,061.—DIGITAL OPTICAL COMPUTER TECHNIQUES. AUG. 26, 1975.
3,978,342.—DUAL MODE RADIATION TRANSMITTING APPARATUS. AUG. 31, 1976.
3,987,685.—CURSOR POSITION DEVICE. OCT. 26, 1976.

Class 17B 1

3,476,473.—FONT INDICATOR. NOV. 4, 1969.
3,481,668.—IMAGE PROJECTION APPARATUS. DEC. 2, 1969.
3,501,838.—PANTOGRAPHIC IMPLEMENTED OVERHEAD PROJECTOR. MAR. 24, 1970.
3,670,633.—RECORDING APPARATUS. JUNE 20, 1972.
3,677,148.—OPTICAL RECORDER. JULY 18, 1972.
3,678,820.—OPTICAL SYSTEM FOR PROJECTION RECORDING APPARATUS. JULY 25, 1972.
3,685,406.—OPTICAL RECORDER. AUG. 22, 1972. BEL. 0777014, CAN. 0960743, FRA. 7146254, GRB. 1372379, ITL. 0944111.
3,695,161.—ALPHANUMERIC PROJECTION DISC ASSEMBLY. OCT. 3, 1972.
3,700,325.—OPTICAL SYSTEM FOR PHOTOCOPYING APPARATUS. OCT. 24, 1972. BEL. 0764830, CAN. 0931409, FRA. 7111622, GRB. 1337447, ITL. 0922162.
3,705,543.—OPTICAL RECORDER. DEC. 12, 1972. CAN. 0948266, GRB. 1372378.
3,759,149.—MULTIPLE FLASH LAMP ALPHANUMERIC PROJECTION DISC ASSEMBLY. SEPT. 18, 1973. CAN. 1002363.
3,759,612.—OPTICAL SYSTEM. SEPT. 18, 1973. BEL. 0792669, CAN. 0972193, FRA. 7243897, GRB. 1395580, ITL. 0984616, SWD. 7216146.
3,768,384.—PROJECTION ASSEMBLY. OCT. 30, 1973.
3,873,207.—POLARIZING INTERFEROMETER. MAR. 25, 1975.
3,880,497.—METHOD OF STORING OPTICAL INFORMATION ON A RANDOM CARRIER. APR. 29, 1975. CAN. 1004887, FRA. 7408054.
3,883,244.—APERTURE ADJUSTMENT IN OPTICAL ASSEMBLY. MAY 13, 1975.
3,897,136.—POLARIZATION-GRATING MOIRE. JULY 29, 1975.
3,909,103.—LENS SCAN MECHANISM. SEPT. 30, 1975.
4,035,068.—SPECKLE MINIMIZATION IN PROJECTION DISPLAYS BY REDUCING SPATIAL COHERENCE OF IMAGE LIGHT. JULY 12, 1977.

Class 17B 2

3,355,308.—PROJECTION TRANSPARENCY HAVING A TRANSPARENT POWDER IMGE. NOV. 28, 1967.
3,476,478.—APPARATUS FOR CHANGING MAGNIFICATION OF PHOTOCOPIER W/O CHANGING CONJUGATE LENGTH OF OPTICAL SY. NOV. 4, 1969. ARG. 0172460, AUS. 0415808, BEL. 0708650, BRA. 6795668, CAN. 0845405, FRA. 1552364, GER. 1297981, GRB. 1223427. ITL. 0821929, MEX. 0100019, VZL. 0023689.
3,508,812.—HIGHLY CORRECTED SIX ELEMENT GAUSS TYPE LENS. APR. 28, 1970.
3,510,219.—OPTICAL ALIGNMENT SYSTEM. MAY 5, 1970. ARG. 0172455, BRA. 6793791, CAN. 0881018, CHL. 0023570, GRB. 1206966, MEX. 0101166, PRU. 0009329, SPN. 0360896, STZ. 0501233, SWD. 0359168, URG. 0008831, VZL. 0025783.
3,591,256.—VARIABLE MAGNIFICATION LENS SYSTEM. JULY 6, 1971. BEL. 0731553, CAN. 0881019, FRA. 6911559, GRB. 1234515, ITL. 0857660, JAP. 0857539.
3,592,531.—SPLIT DAGOR-TYPE OF SYMMETRICAL COPYING LENS SYSTEM. JULY 13, 1971. CAN. 0929389.
3,600,066.—OPTICAL ASSEMBLY WITH SUPPLEMENTAL LENS MEANS. AUG. 17, 1971. CAN. 0943792, GRB. 1261159, JAP. 0728824.
3,612,662.—EYEPIECE HAVING A WIDE FIELD OF VIEW AND A LARGE EYE RELIEF. OCT. 12, 1971.
3,620,603.—OFF-CENTER FOCUSING SYSTEM. NOV. 16, 1971.
3,630,599.—MECHANICALLY COMPENSATED ZOOM LENS SYSTEM. DEC. 28, 1971. CAN. 0960891, GRB. 1363113.
3,640,605.—MECHANICALLY COMPENSATED ZOOM LENS SYSTEM. FEB. 8, 1972.
3,659,922.—SYMMETRICAL HALF-LENS OPTICAL SYSTEM. MAY 2, 1972.
3,672,748.—SPLIT DAGOR-TYPE OF SYMMETRICAL COPYING LENS SYSTEM. JUNE 27, 1972. ATR. 0322874, AUS. 0467299, BEL. 0783478, CAN. 0960495, GRB. 1358349, ITL. 0955474, SPN. 0402705, STZ. 0544315, SWD. 7206274.
3,741,621.—ADD LENS PROJECTION SYSTEM WITH BALANCED PERFORMANCE. JUNE 26, 1973. BEL. 0781514, CAN. 0963300, FRA. 7208375, GRB. 1393151, ITL. 0950848.
3,817,599.—PROJECTION LENS WITH ADD LENS ELEMENTS. JUNE 18, 1974. CAN. 1008710.
3,865,470.—VARIABLE MAGNIFICATION LENS SYSTEM. FEB. 11, 1975. BEL. 0819497, FRA. 7429827, SPN. 0429431.
3,865,471.—LENS SYSTEM FOR PHOTOELECTROPHORETIC COPYING MACHINE. FEB. 11, 1975.
3,880,498.—ZOOM LENS ASSEMBLY. APR. 29, 1975.
3,907,401.—HIGH PERFORMANCE OPTICAL OBJECTIVE. SEPT. 23, 1975.
3,975,289.—CHARGE TRANSFER COMPLEXEX OF FERRONCENES HAVING LIGHT FILLING PROPERTIES. AUG. 17, 1976.
4,025,541.—CHARGE TRANSFER OF FERROCENES HAVING LIGHT FILTERING PROPERTIES. MAY 24, 1977.

Class 17B 3

3,393,956.—UNIFORM-FIELD KERR CELL. JULY 23, 1968.
3,408,133.—KERR-CELL CAMERA SHUTTER. OCT. 29, 1968.

Class 17B 4

3,358,081.—FACSIMILE PRINTER WITH FERROELECTRIC MODULATOR. DEC. 12, 1967. CAN. 0898336, GRB. 1128973.
3,360,323.—TRANSVERSE MAGNETO-OPTICAL ROTATOR WITH COMPENSATION OF PHASE BETA RDATION. DEC. 26, 1967.
3,601,468.—OPTICAL LIGHT WAVE MODULATOR FOR REPRESENTING A FIRST COLOR LIGHT WAVE AS SECOND COLOR LIGHT WA. AUG. 24, 1971.
3,938,881.—ACOUSTO-OPTIC MODULATION DEVICE. FEB. 17, 1976.
4,011,009.—REFLECTION DIFFRACTION GRATING HAVING A CONTROLLABLE BLAZE ANGLE. MAR. 8, 1977.

Class 17C

3,870,921.—IMAGE INTENSIFIER TUBE WITH IMPROVED PHOTOEMITTER SURFACE. MAR. 11, 1975.

Class 17C 1

3,277,297.—ION IMAGE TO ELECTRON IMAGE CONVERTER. OCT. 4, 1966.
3,322,999.—IMAGE-INTENSIFIER TUBE. MAY 30, 1967.
3,519,870.—SPIRLD STRIP MATRL HAVNG PRLEL GROVS FRMNG PLURALITY OF ELCTRN MULTIPLIER CHANNELS. JULY 7, 1970.
3,983,045.—THREE COMPONENT DEVELOPER COMPOSITION. ARG. 0194232, ATR. 0334199, AUS. 0462045, BEL. 0789987, CHL. 0027625, FRA. 7236617, GRB. 1402009, ITL. 0968815, MEX. 0125231, NZL. 0168638, PNM. 0002796, SAF. 0727225, SPN. 0407564, STZ. 0028096, SWD. 7213035, TIW. 0007666, VZL. 0012802.

Class 17C 2

3,368,077.—INFRA-RED IMAGE INTENSIFIER HAVING A TUNNEL-EMISSION CATHODE HAVING A CONDUCTIVE MOSAIC. FEB. 6, 1968.
3,949,225.—INFRARED IMAGING APPARATUS. APR. 6, 1976.

Class 17C 3

3,446,561.—PASSIVE BRIGHT PATTERN RETICLE. MAY 27, 1969.
3,837,732.—PARTIALLY TRANSPARENT PLATED FOR INCREASED IMAGE CONTRAST. SEPT. 24, 1974. CAN. 0893234, GRB. 1237697, JAP. 0645592.

Class 17C 4

3,441,736.—IMAGE INTENSIFIER INCLUDING SEMI-CONDUCTOR AMPLIFIER LAYER. APR. 29, 1969.

Class 17D

D.235,655.—DISPLAY DEVICE. JULY 1, 1975.
3,987,413—DETECTION SYSTEM. OCT. 19, 1976.
4,035,061.—HONEYCOMB DISPLAY DEVICES. JULY 12, 1977.

Class 17D 1

3,422,737.—VARIABLE FONT CHARACTER GENERATOR. JAN. 21, 1969. ARG. 0157019, BRA. 0087922, CAN. 0788611, CHL. 0022222, FRA. 1506176, GRB. 1162840, ITL. 0788951, JAP. 0590133, MEX. 0094427.
3,519,867.—ELECTRIC DISCHARGE TUBE FOR DISPLAYING ALPHNUMERIC CHARACTER SYMBOLS. JULY 7, 1970.
3,564,319.—CATHOD RAY TUBE W/MATRIX FRMG ELEMNTL ELECTRN BEAMS AND MEANS SELECTVLY FRMG INTO CHAR AT FACE PLA. FEB. 16, 1971.
3,587,083.—CHARACTER GENERATION AND DISPLAY SYSTEM. JUNE 22, 1971. CAN. 0858092, FRA. 1582728, GER. 1774884, GRB. 1234580, ITL. 0846528, JAP. 0678504.
3,641,557.—CIRCUIT ARRANGEMENT FOR AN ELECTRIC DISCHARGE TUBE. FEB. 8, 1972.
3,742,484.—CHARACTER GENERATING APPARATUS EMPLOYING BIT STEAM LENGTH CORRECTION. JUNE 26, 1973.
3,781,848.—DISPLAY SYSTEM - CHARACTER GENERATOR SYSTEM A. DEC. 25, 1973.
3,810,165.—ELECTRONIC DISPLAY DEVICE. MAY 7, 1974.
3,830,646.—IMAGE REGISTRATION CORRECTION FOR NON-IMPACT PRINTERS. AUG. 20, 1974. CAN. 0986764, FRA. 7339099, GRB. 1440507.
3,911,419.—CONTROLLER FOR CURSOR POSITIONING ON A DISPLAY MEDIUM. OCT. 7, 1975.
3,952,296.—VIDEO SIGNAL GENERATING APPARATUS WITH SEPARATES PROCESSING OF ODD AND EVEN VIDEO BITS. APR. 20, 1976.

Class 17D 2

RE.28,360.—ELECTROPHORETIC COLOR DISPLAY DEVICE. MAR. 4, 1975.
3,524,022.—ELECTRO-OPTICAL DISPLAY SYSTEM. AUG. 11, 1970.
3,588,584.—APPARATUS FOR POSITIONING A LIGHT SPOT ONTO A CHARACTER MASK. JUNE 28, 1971.
3,612,758.—COLOR DISPLAY DEVICE - REISSUED D 2717R. OCT. 12, 1971.

Class 17D 3

3,198,976.—ELECTRIC DISCHARGE TUBES AND APPLICATIONS THEREOF. AUG. 3, 1965.
3,264,638.—ELECTRONIC CODE TRANSLATION. AUG. 2, 1966. CAN. 0740559.
3,349,677.—ALPHA NUMERIC CHARACTER PRINTER. OCT. 31, 1967.
3,403,390.—MESSAGE STORAGE. SEPT. 24, 1968. GRB. 1078401.
3,861,804.—INFEROMETRY READOUT OF PHASE INFORMATION. JAN. 21, 1975. CAN. 0980745, GRB. 1387905.
3,898,377.—VIDEO MIXER. AUG. 5, 1975.

Class 17D 4

3,478,659.—APPARATUS FOR JUSTIFYING A REPRODUCED LINE OF CHARACTERS. NOV. 18, 1969.

Class 17D 5

3,330,190.—PRINTING APPARATUS. JULY 11, 1967. CAN. 0758791, GER. 1280282, GRB. 1102419, JAP. 0529726.

Class 17E

3,852,775.—MOVING BELT SCANNING PRINTER. DEC. 3, 1974.
4,027,961.—COPIER/PASTER SCAN APPARATUS. JUNE 7, 1977.

Class 17E 1

3,337,718.—LIGHT SCAN RECORDING AND READOUT. AUG. 22, 1967. CAN. 0794443, GRB. 1070030.
3,426,144.—TRANSCEIVER APPARATUS FOR TRANSMITTING AND RECORDING OPTICAL INFORMATION. FEB. 4, 1969. CAN. 0810757, GRB. 1158568, JAP. 0579399.
3,426,354.—ELECTROSTATIC CHARGE IMAGE RECORDER. FEB. 4, 1969. AUS. 0295167, BEL. 0664729, CAN. 0739120, DNK. 0115269, FRA. 1455131, GER. 1280281, GRB. 1084494, HOL. 0136720, ITL. 0761085, JAP. 0492014, STZ. 0444906, SWD. 0338117.
3,548,195.—RADIATION SENSITIVE DOCUMENT SCANNING MEANS. DEC. 15, 1970. CAN. 0901968, FRA. 1592840, GER. 1809854, GRB. 1230836, ITL. 0848026, JAP. 0587941.
3,553,463.—RADIATION SENSITIVE DOCUMENT SCANNING APPARATUS USING HELICAL SCANNER. JAN. 5, 1971.
3,775,559.—APERTURE DESIGNS FOR FACSIMILE SCANNING APPARATUS. NOV. 27, 1973. CAN. 0960770, GRB. 1376189.
3,820,900.—INSTRUMENT FOR SCANNING DOCUMENT FOR QUALITY. JUNE 28, 1974.
3,867,571.—FLYING SPOT SCANNER. FEB. 18, 1975. CAN. 0995351.
3,898,470.—SCANNING ARRANGEMENT FOR MULTIFUNCTION OPERATION. AUG. 5, 1975.
3,922,485.—FLYING SPOT SCANNER WITH SCAN DETECTION. NOV. 25, 1975.
3,944,323.—VARIABLE SPOT SIZE SCANNING. MAR. 16, 1976. BEL. 0835552.
3,946,150.—OPTICAL SCANNER. MAR. 23, 1976.
3,962,538.—FLYING SPOT SCANNING SYSTEM WITH VIRTUAL SCANNERS. JUNE 8, 1976.
3,966,319.—FLAT FIELD SCREENING MIRROR. JUNE 29, 1976.
3,970,359.—FLYING SPOT FLAT FIELD SCANNER. JULY 20, 1976.
3,973,825.—FLAT FIELD SCANNING SYSTEM. AUG. 10, 1976. BEL. 0836735.
3,974,506.—SCANNING SYSTEM FOR IMAGING CHARACTERS COMBINED WITH GRAPHIC CURVES. AUG. 10, 1976.
3,997,721.—FLYING SPOT SCANNING SYSTEM WITH REDUCED SCAN ANGLE. DEC. 14, 1976.
4,006,299.—FLAT FILLED SCANNING SYSTEM. FEB. 1, 1977. BEL. 0836543.
4,012,585.—INPUT AND OUTPUT FLYING SPOT SCANNING SYSTEM. MAR. 15, 1977.
4,015,081.—MULTIFUNCTION SCANNING SYSTEM. MAR. 29, 1977. BEL. 0836790.
4,021,897.—A PROCESS FOR PROVIDING CEMENTED GLASS FLATS TO PROVIDE HIGH SPEED MULTIFACETED POLYGONAL SCAN. APR. 10, 1977.

4,034,408.—FLYING SPOT SCANNER. JULY 5, 1977. GRB. 1452300.

Class 17E 2

3,407,329.—SCANNED CONVERSION TUBE. OCT. 22, 1968. CAN. 0836783, GER. 1639461, GRB. 1190967, JAP. 0565840.

3,437,408.—MULTIPLE COPY ELECTROSTATIC IMAGING APPARATUS. APR. 8, 1969. ARG. 0164840, ATR. 0283115, AUS. 0410817, BEL. 0704323, CAN. 0831674, CZC. 0156411, EGR. 0065587, FRA. 1538197, GER. 1597879, GRB. 1202583, HUN. 0161168, ITL. 0822157, JAP. 0582502, MEX. 0099950, SPN. 0345482, STZ. 0484459, SWD. 0331795, USR. 0353450, VZL. 0023662.

3,474,417.—FIELD EFFECT SOLID STATE IMAGE PICKUP AND STORAGE DEVICE. OCT. 21, 1969. CAN. 0869188, GER. 1549144, GRB. 1203095, JAP. 0568732.

3,523,188.—SEMICONDUCTOR CURRENT CONTROL DEVICE AND METHOD. AUG. 4, 1970.

Class 17E 3

3,485,945.—ELECTRONIC LENTICULAR RECORDING SYSTEM. DEC. 23, 1969.

3,510,570.—ELECTRONIC LENTICULAR DISPLAY SYS. MAY 5, 1970.

3,650,621.—OPTICAL IMAGING SYSTEM. MAR. 21, 1972. BEL. 0747978, CAN. 0927470, FRA. 7011548, GRB. 1297907, ITL. 0898936, JAP. 0731225.

3,655,284.—LONGITUDINALLY INSENSITIVE LENS STRIP IMAGING DEVICE. APR. 11, 1972.

3,827,062.—OPTICAL ARRANGEMENT FOR HIGH SPEED PRINTOUT SYSTEM. JULY 30, 1974.

3,853,387.—VARIABLE MAGNIFICATION LENS ASSEMBLY HAVING TWO ADD LENSES. DEC. 10, 1974.

3,865,470.—VARIABLE MAGNIFICATION LENS SYSTEM. FEB. 11, 1975. BEL. 0819497, FRA. 7429827, SPN. 0429431.

Class 17E 4

3,279,342.—COMMUNICATION PRINTER. OCT. 18, 1966. CAN. 0767902, GRB. 1120446, JAP. 0698291.

3,481,668.—IMAGE PROJECTION APPARATUS. DEC. 2, 1969.

3,485,546.—FIELD FLATTENER SCANNING MEANS. DEC. 23, 1969. CAN. 0850916, GRB. 1196373, JAP. 0667705.

3,504,960.—SAGITTAL RAY APERTURE STOP. APR. 7, 1970. AUS. 0413558, BEL. 0704924, CAN. 0849815, FRA. 1540700, GRB. 1209472, ITL. 0814606, JAP. 0972613.

3,532,425.—GRAPHIC DISTORTION APPARATUS. OCT. 6, 1970.

3,544,190.—LENS STRIP OPTICAL SCANNING SYSTEM. DEC. 1, 1970. CAN. 0904070, GRB. 1278336.

3,584,950.—LENS STRIP OPTICAL SCANNING SYSTEM. JUNE 15, 1971.

3,584,952.—LENS STRIP OPTICAL SCANNING SYSTEM - REISSUED D 2074R. JUNE 15, 1971.

3,584,953.—SHORT FOCAL OPTICAL LENGTH SCANNING SYSTEM. JUNE 15, 1971.

3,963,343.—CAMMING SYSTEMS. JUNE 15, 1976. BEL. 0824049.

4,006,648.—CAMMING SYSTEM. FEB. 8, 1977. BEL. 0824049.

Class 17E 5

3,155,022.—BUFFER FOR ELECTRONIC DISPLAY READOUT. NOV. 3, 1964. CAN. 0773751, GRB. 1056114, JAP. 0542586.

3,219,993.—IMAGE FORMATION AND DISPLAY UTILIZING A THERMOTROPICALLY COLOR REVERSIBLE MATERIAL. NOV. 23, 1965. CAN. 0762159, GER. 1222795, ITL. 0753655, JAP. 0474129.

3,249,757.—THERMAL IMAGING DEVICE. MAY 3, 1966.

3,995,278.—SUPERCONDUCTIVE MAGNETOSTATIC PRINTER. NOV. 30, 1976.

Class 17E 6

3,456,074.—IMAGE STABILIZATION OF OPTICAL IMAGING SYSTEMS. JULY 15, 1969.

3,461,227.—MECHANICAL JITTER EQUALIZER. AUG. 12, 1969. CAN. 0824819, GRB. 1198303.

3,873,189.—ADJUSTABLE-POSITION OPTICAL SYSTEM. MAR. 25, 1975.

Class 17F 1

3,325,674.—MOVING TARGET DISPLAY INDICATOR. JUNE 13, 1967.

3,340,419.—ELECTRIC DISCHARGE TUBES. SEPT. 5, 1967. CAN. 0773690.

3,447,026.—CRT SCAN STABILIZER. MAY 27, 1969. GER. 1490986.

3,483,414.—STORG TUBE HVG FLD EFF LAYR W/ CONDCTG PINS EXT TO LAYR THAT READOUT NOT ERASE CHG PATTERN. DEC. 9, 1969. CAN. 0850846, GER. 1537566, GRB. 1203432, JAP. 0565841.

Class 17F 2

3,153,785.—TIME COMPRESSED DISPLAY. OCT. 20, 1964. CAN. 0708306, GRB. 1008993.

3,579,024.—SELECTIVE BLANKING CONTROL CIRCUIT. MAY 18, 1971.

Class 17G

3,619,714.—PANEL DISPLAY DEVICE. NOV. 9, 1971.

4,003,742.—VELOCITY COMPENSATION FOR BEAD BYPASS WITH SPEED REDUCTION. JAN. 18, 1977.

Class 17G 1

3,459,946.—SOLID STATE STORAGE DEVICE. AUG. 5, 1969.

3,510,660.—METHOD FOR VISUAL COMPARISON OF INFORMATION. MAY 5, 1970. CAN. 0848611, GRB. 1201376, JAP. 0595641.

3,539,862.—DUAL CONDUCTOR STORAGE PANEL. NOV. 10, 1970. ARG. 0175067, AUS. 0414034, BEL. 0723721, CAN. 0878168, FRA. 1591040, GER. 1808238, GRB. 1235310, HOL. 0150616, ITL. 0847618, JAP. 0742515, MEX. 0111871, SPN. 0360366, STZ. 0493930, SWD. 0345341, VZL. 0023718.

4,002,998.—EXTERNALLY CONTROLLABLE MINIATURE LASERS. JAN. 11, 1977.

Class 17G 2

3,531,647.—DEVICE AND PROCESS FOR REDUCTION OF BACKGROUND LIGHT IN SOLID STATE STORAGE PANELS. SEPT. 29, 1970. CAN. 0862333, FRA. 1540063, GER. 1549143, GRB. 1201375, ITL. 0818126, MEX. 0101197.

3,531,648.—SOLID STATE STORAGE PANEL FOR COLOR REPRODUCTION. SEPT. 29, 1970. CAN. 0846433, GRB. 1201377.

3,540,008.—SOLID STATE STORAGE DEVICES HAVING NON-CORONA EXTINCTION CAPABILITY. NOV. 10, 1970. ARG. 0166245, AUS. 0424286, BEL. 0725616, CAN. 0897827, FRA. 1599275, GER. 1815243, GRB. 1250023, ITL. 0849327, JAP. 0742516, MEX. 0106020, SPN. 0361652, STZ. 0504755, SWD. 0361123, VZL. 0023729.

3,561,964.—METHOD FOR PRODUCTION OF SOLID STATE STORAGE PANELS. FEB. 9, 1971. ARG. 0184633, AUS. 0427883, BEL. 0736077, CAN. 0866994, FRA. 6924001, GER. 1935763, GRB. 1270845, HOL. 0150271, ITL. 0870080, JAP. 0681942, MEX. 0113574, SPN. 0369656, STZ. 0513430, SWD. 0358991, VZL. 0023743.

3,594,610.—DISPLAY PANEL WITH CORONA DISCHARGE CONTROL. JULY 20, 1971.

Class 17G 3

3,154,636.—THREE DIMENSIONAL DISPLAY DEVICE. OCT. 27, 1964. CAN. 0794989, GRB. 1029611, JAP. 0462394.

3,205,403.—ELECTROLUMINESCENT DISPLAY SYSTEMS. SEPT. 7, 1965.

3,221,335.—ELECTRO-OPTICAL RECORDING AND VISUAL DISPLAY SYSTEMS. NOV. 30, 1965. AUS. 0226551, CAN. 0801882, FRA. 1202340, GER. 1107705, GRB. 0880692, JAP. 0306714.

3,989,355.—ELECTRO-OPTIC DISPLAY SYSTEM. NOV. 2, 1976.

Class 17G 4

3,293,441.—IMAGE INTENSIFIER WITH FERRO-ELECTRIC LAYER AND BALANCED IMPEDANCES. DEC. 20, 1966.

3,300,645.—FERROELECTRIC IMAGE INTENSIFIER INCLUDING INVERSE FEEDBACK MEANS. JAN. 24, 1967.

3,440,428.—IMAGE CONVERTER USING CHARGED PHOTOEMISSIVE LAYER. APR. 22, 1969. CAN. 0858119, GER. 1639462, GRB. 1202049, JAP. 0565839.
3,441,736.—IMAGE INTENSIFIER INCLUDING SEMI-CONDUCTOR AMPLIFIER LAYER. APR. 29, 1969.
3,531,646.—ENHANCEMENT OF ELECTROSTATIC IMAGES. SEPT. 29, 1970. CAN. 0892186, GRB. 1199462, JAP. 0641476.
3,543,032.—DEVICE AND PROCESS FOR AMPLIFYING AND STORING AN IMAGE. NOV. 24, 1970. ARG. 0177440, CAN. 0880586, MEX. 0111518, PNM. 0001809, VZL. 0027508.

Class 17H

3,742,281.—CONTROLLED SPECTRUM FLASH LAMP. JUNE 26, 1973.
3,949,979.—SINGLE LONGITUDINAL MODE GAAS/GAALAS DOUBLE HETEROSTRUCTURE LASER. APR. 13, 1976.
3,995,110.—FLYING SPOT SCANNER WITH PLURAL LENS CORRECTION. NOV. 30, 1976.
4,021,845.—A LASER FOR GENERATING WHITE LIGHT. MAY 3, 1977. BEL. 0846954.

Class 17H 1

3,427,564.—HIGH-POWER IONIZED GAS LASER STRUCTURE. FEB. 11, 1969.
3,437,950.—ION LASER HAVING A METAL TUBE SHRINK-FITTED ONTO THE CERAMIC DISCHARGE TUBE. APR. 8, 1969.
3,523,256.—HEAT PUMPED LASER. AUG. 4, 1970.
3,529,261.—LASR HVNG ACTV MEDIUM WHCH IS AN EXCTD HALOGN WHSE LOWR ENRGY ST IS DEPLETD BY REACTNG W/ALKAL. SEPT. 15, 1970. CAN. 0816276, FRA. 1446601, GER. 1299367, GRB. 1124346, ITL. 0726918.
3,562,173.—LASER MATERIALS. FEB. 9, 1971.
3,860,888.—TIME-SHARING TWO FREQUENCY LASER. JAN. 14, 1975.
3,954,534.—LIGHT EMITTING DIODE ARRAY WITH DOME GEOMETRY. MAY 4, 1976.
3,969,686.—BEAM COLUMNATION USING MULTIPLE COUPLED ELEMENTS. JULY 13, 1976.
3,970,958.—ELECTRICALLY PUMPED SOLID-STATE DISTRIBUTED FEEDBACK LASER WITH PATICULAR GRATING SPACING. JULY 20, 1976. BEL. 0834484.
3,978,428.—BURIED-HETEROSTRUCTURE DIODE INJECTION LASER. AUG. 31, 1976.
4,006,432.—INTEGRATED GRATING OUTPUT COUPLER IN DIODE LASERS. FEB. 1, 1977. BEL. 0834480.
4,023,993.—METHOD OF MAKING AN ELECTRICALLY PUMPED SOLID STATE DISTRIBUTED FEEDBACK LASER. MAY 17, 1977. BEL. 0832000, SPN. 0440361.
4,033,796.—METHOD OF MAKING BURIED-HETEROSTRUCTURE DIODE INJECTION LASER. JULY 5, 1977.

Class 17H 2

3,296,541.—BROADBND TRVLNG WAVE MASER W/BOTH MASER AND ISOLATOR CRYSTALS CUT ATDFRNT ANGLES TO OPTICAL AXIS. JAN. 3, 1967.
3,983,509.—DISTRIBUTED FEEDBACK DIODE LASER. SEPT. 28, 1976.

Class 17H 3

3,258,597.—LASER HETERODYNE COMMUNICATION SYSTEM. JUNE 28, 1966.
3,465,166.—FAR INFRA-RED COHERENT LIGHT GENERATOR. SEPT. 2, 1969.
3,499,159.—POLYCHROMATIC LASER AEROSOL SIZING AND RANGING-PLASAR-TECHNIQUE. MAR. 3, 1970.
3,500,236.—LASER STABILIZING SYSTEM. MAR. 10, 1970.
3,534,289.—LASER SYSTEM WITH OPTICAL DISCRIMINATOR. OCT. 13, 1970.
3,753,144.—GAS LASER STRUCTURE. AUG. 14, 1973.
3,909,254.—LASER RECORDING METHOD. SEPT. 30, 1975.
4,012,776.—LUMINESCENT SCREEN LASER SCANNING TECHNIQUE. MAR. 15, 1977.

Class 17I

3,630,598.—OPTICAL DEMODULATION FILTER. DEC. 28, 1971. BEL. 0761134, CAN. 0904628, GRB. 1330709, ITL. 0914073, JAP. 0770139.
3,650,605.—INTERFERAMETRIC APPARATUS WITH CONTROLLED SCANNING MEANS. MAR. 21, 1972. CAN. 0952749.
3,687,535.—OPTICAL DEMODULATION SYSTEM. AUG. 29, 1972. BEL. 0762859, CAN. 0944075, FRA. 7105649, GRB. 1343483, ITL. 0918450.
3,689,267.—SCREEN MAKING PROCESS UTILIZING ROTATION OF OPTICAL PLATE. SEPT. 5, 1972. CAN. 0950736.
3,697,184.—APPARATUS FOR EVALUATING THE RECORDING CHARACTERISTICS OF A THERMOPLASTIC PHOTORECEPTOR. OCT. 10, 1972. CAN. 1003484, GRB. 1389471.
3,776,995.—METHOD OF PRODUCING X-RAY DIFFRACTION GRATING. DEC. 4, 1973. CAN. 0944871, GRB. 1363262.

Class 17I 1

3,191,440.—PRESSURE GAUGE INSTRUMENT. JUNE 29, 1965.
3,249,760.—PRESSURE GAUGE INSTRUMENT. MAY 3, 1966.

Class 17I 2

3,416,865.—OPTICAL DENSITY MEASURING SYSTEM. DEC. 17, 1968.
3,609,047.—SINGLE BEAM PHOTOMETER SYSTEM WHEREIN THE ABSORBANCE OF A SAMPLE IS DETERMINED RELATIVE TO REFE. SEPT. 28, 1971.

Class 17I 3

3,560,085.—APPARATUS FOR GRAPHIC DISTORATION. FEB. 2, 1971.
3,697,063.—DOCUMENT HANDLING APPARATUS. OCT. 10, 1972. GRB. 1369618.

Class 17J

D.236,733.—CURSOR POSITION CONTROLLER. SEPT. 9, 1975.
3,447,030.—COLD SEAL LAMP PRESSURE REGULATION. MAY 27, 1969.
3,642,377.—COLOR PRINTING SYSTEM. FEB. 15, 1972.
3,733,123.—METHOD AND APPARATUS FOR ENCLOSING A LAMP. MAY 15, 1973. ARG. 0198292, AUS. 0466394, BEL. 0789338, FRA. 7234198, GRB. 1410046, ITL. 0967625, MEX. 0128585, SPN. 0409972, STZ. 0549825, SWD. 0360935.
3,775,006.—APPARATUS FOR OPTICAL COLOR SEPARATION. NOV. 27, 1973.
3,795,805.—APPARATUS FOR TESTING A CREDIT CARD. MAR. 5, 1974.
3,873,813.—CREDIT CARD. MAR. 25, 1975.
3,892,963.—TRANSDUCER FOR A DISPLAY-ORIENTED POINTING DEVICE. JULY 1, 1975. FRA. 7440265.
3,915,553.—ELECTROOPTIC COLOR FILTER SYSTEM. OCT. 28, 1975.
3,936,179.—SUPPORT STRUCTURE FOR A DUPLICATOR OPTICAL SYSTEM. FEB. 3, 1976.
3,951,521.—REVERSIBLE RADIANT ENERGY FILTER AND PROCESS OF USING SAME. APR. 20, 1976.
3,977,785.—METHOD & APP FOR INHIBITING THE OPERATION OF A COPYING MACHINE. AUG. 31, 1976.

Class 18

2,578,677.—METHOD OF MAKING PHOTOGRAPHIC SENSITIZING DYES. DEC. 18, 1951.
3,736,133.—TRANSPARENT INK - ABSORBENT LAQUERS. MAY 29, 1973. ARG. 0193996, CAN. 0985583. GRB. 1390137, MEX. 0127276. VZL. 0033577.
3,738,832.—COLOR ELECTROPHOTOGRAPHIC PROCESS EMPLOYING LIQUID DEVELOPER CONTAINING GELATINAIN. JUNE 12, 1973.
3,860,484.—ENZYME STABILIZATION. JAN. 14, 1975.
3,985,666.—PLASTIC MATERIALS MIXED WITH POLAR GROUP CONTAINING MATERIALS. OCT. 12, 1976. ARG. 0195541, BEL. 0781970, CAN. 0976742, FRA. 7213873, GRB. 1396141, ITL. 0951326, MEX. 0126158, VZL. 0032937.

Class 18A

2,653,152.—CYANINE DYE AND PROCESS OF MAKING SAME. SEPT. 22, 1953.
3,238,150.—PHOTOCONDUCTIVE CADMIUM SULFIDE POWDER AND METHOD FOR THE PREPARATION THEREOF. MAR. 1, 1966. CAN. 0712516, GRB. 1062022, JAP. 0486530.

3,402,177.—SUBSTITUTED 1-CYANO-2,3-PHTHALOYL-7,8-BENZOPYRPOCOLINES. SEPT. 17, 1968. AUS. 0435189, BEL. 0743896, CAN. 0812820, GRB. 1145373.

3,471,290.—PHOTOCHROMIC PHOTORESIST IMAGING. OCT. 7, 1969.

3,478,064.—1,5-BIS-SUBSTITUTED ALKYLAMINO-ANTHRAQUINONES. NOV. 11, 1969. ARG. 0145636, AUS. 0419687, BEL. 0683222, CAN. 0880309, FRA. 1484968, GRB. 1155986, ITL. 0771955, JAP. 0581828, MEX. 0092775, SPN. 0328428, STZ. 0461273, SWD. 0328188, VZL. 0021224.

3,482,973.—IMAGING SYSTEM. DEC. 9, 1969.

3,485,633.—ELECTROPHORETIC IMG PROC EMPL METALLIC LAKES OF FLUCRESCEIN DERIVATIVES AS ELECTRICLY PHOTOSENS. DEC. 23, 1969. AUS. 0444394, BEL. 0743641, CAN. 0848386, GER. 1572387, GRB. 1190965. JAP. 0586923.

3,562,248.—BISAZC FGMTS DRVD CPLRS CBTC CONDG 8-AMINO-2-NAPHTHOLS W/ DICARBOXYLIC ACID CHLORIDES. FEB. 9, 1971. ATR. 0302037, AUS. 0435392, BEL. 0743422, CAN. 0889836, FRA. 6944290, GER. 1717183, GRB. 1217905, ITL. 0879047, JAP. 0608727.

3,667,943.—QUINACRIDONE PIGMENTS IN ELECTROPHOTOGRAPHIC IMAGING. JUNE 6, 1972. ARG. 0184823, AUS. 0452663, BEL. 0737810, CAN. 0877882, EGR. 0077411, FRA. 6928700, GRB. 1278702, ITL. 0888005, JAP. 0683893, SPN. 0370720, STZ. 0519183, SWD. 0346396, TIW. 0005517, USR. 0351396.

3,667,944.—QUINACRIDONE PIGMENTS IN ELECTROPHOTOGRAPHIC RECORDING. JUNE 6, 1972. ARG. 0177369, AUS. 0452031, BEL. 0741159, CAN. 0884807, FRA. 6937223, GRB. 1286079, ITL. 0879710, JAP. 0693421, MEX. 0115407.

3,667,945.—QUINACRIDONE PIGMENTS IN ELECTROPHOTOGRAPHIC IMAGING. JUNE 6, 1972.

3,671,467.—SELENIUM CONTAINING POLYMERS. JUNE 20, 1972. ARG. 0190619, BEL. 0770689, CAN. 0941544, FRA. 7128500, GRB. 1364297, ITL. 9308410, SPN. 0393651. VZL. 0029342.

3,694,201.—METHOD FOR PHOTOCONDUCTIVE POWDER. SEPT. 26, 1972. BEL. 0777717, CAN. 0982808, FRA. 7201003, GRB. 1381162, ITL. 0946352.

3,708,292.—PI-FORM METAL PHTHALOCYANINE. JAN. 2, 1973. ARG. 0194234, BEL. 0783793, CAN. 0996931, GRB. 1396922, ITL. 0955644, MEX. 0128928.

3,708,293.—PI-FORM METAL-FREE PHTHALOCYANINE. JAN. 2, 1973. ARG. 0195167, BEL. 0783792, CAN. 0995211, GRB. 1395769, ITL. 0955643, MEX. 0131970, VZL. 0034272.

3,837,850.—PHOTOCONDUCTIVE BUTILE TITANIUM DIOXIDE. SEPT. 24, 1974.

3,867,145.—METHANOL AND HEAT TREATED ZINC OXIDE. FEB. 18, 1975.

3,905,958.—SELENIUM COMPOUNDS. SEPT. 16, 1975.

3,965,049.—ONE-STEP SYNTHESIS OF AROMATIC ORGANIC DISELENIDES. JUNE 22, 1976.

4,007,043.—PHOTOCONDUCTIVE ELEMENTS WITH COPOLYMER CHARGE TRANSPORT LAYERS. FEB. 8, 1977.

4,007,100.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. FEB. 8, 1977.

4,007,101.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. FEB. 8, 1977.

4,013,528.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. MAR. 22, 1977.

4,013,529.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. MAR. 22, 1977.

4,013,530.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. MAR. 22, 1977.

4,014,768.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. MAR. 29, 1977.

4,016,058.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. APR. 5, 1977.

4,028,203.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 7, 1977.

4,030,991.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 21, 1977.

4,030,992.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 21, 1977.

4,030,993.—PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS. JUNE 21, 1977.

Class 18A 1

3,384,488.—POLYCHROMATIC PHOTOELECTROPHORETIC IMAGING COMPOSITION. MAY 21, 1968.

3,447,922.—ELECTRICALLY PHOTOSENSITIVE PARTICLES USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROC. JUNE 3, 1969.

3,448,028.—N-SBSTUD-8,13-DIOXODINAPHTHO-2-1-B,2,3-D-FURAN-6-CARBOXAMIDES AS ELCTLY PTOSNSTV MITS IN ELCPHG. JUNE 3, 1969.

3,531,309.—COMPOSITIONS COMPRISING 1-CYANO-2,3-PHTHALOYL-7,8-BENZOPYRROCOLINES AND A CARRIER. SEPT. 29, 1970.

3,546,085.—PHOTOELECTROPHORETIC IMAGING PROCESS AND SUSPENSION. DEC. 8, 1970. BEL. 0710052, CAN. 0875493, FRA. 1568088, GER. 1622380, GRB. 1208812, ITL. 0823929, JAP. 0594741.

Class 18A 2

3,492,308.—PROCESS FOR PREPARING METAL FREE PHTHALOCYANINES - SYNTHESIS OF METAL-FREE PHTHALOCYANINE. JAN. 27, 1970. CAN. 0922708, GRB. 1216887, JAP. 0586926.

3,492,309.—SYNTHESIS OF ALPHA METAL-FREE PHTHALOCYANINE. JAN. 27, 1970. CAN. 0894803, GRB. 1206306, JAP. 0604155.

3,509,146.—PROCESS OF PREPARING PHTHALOCYANINE AND HETEROCYCLIC ANALOGUES. APR. 28, 1970. CAN. 0865117, GRB. 1232241, JAP. 0587395.

3,672,979.—METHOD OF PRODUCING A PHTHALOCYANINE PHOTOCONDUCTIVE LAYER. JUNE 27, 1972. ARG. 0184673, AUS. 0457271, BEL. 0761135, CAN. 0951697, FRA. 7047702, GRB. 1334060, ITL. 0914074, JAP. 0753795, MEX. 0119529, PLD. 0082204, PNM. 0002191, SPN. 0386759, STZ. 0571731, TIW. 0007180, VZL. 0032789.

3,761,261.—PHTHALOCYANINE DYE SENSITIZERS FOR ZINC OXIDE. SEPT. 25, 1973.

Class 18A 2A

RE.27,117.—METAL FREE PHTHALOCYANINE IN THE NEW X-FORM-RE OF 3,357,989-D1170. APR. 20, 1971.

3,594,163.—METHOD OF CONVERTING ALPHA PHTHALOCYANINE TO THE X FORM. JULY 20, 1971.

3,657,272.—PROCESS FOR PREPARING X-FORM METAL FREE PHTHALOCYANINE. APR. 18, 1972.

3,816,118.—ELECTROPHOTOGRAPHIC ELEMENT CONTAINING PHTHALOCYANINE. JUNE 11, 1974. ARG. 0156316, CAN. 0890855, FRA. 0091579, GRB. 1175451, ITL. 0809972, JAP. 0820183, MEX. 0115884, VZL. 0024012.

3,862,127.—PROCESS. JAN. 21, 1975. AUS. 0453518, BEL. 0754407, FRA. 7028418, GRB. 1268574, ITL. 0929169, JAP. 0727963, SPN. 0382366.

3,903,107.—DIRECT ALPHA TO X PHASE CONVERSION OF METAL CONTAINING PHTHALOCYANINE. SEPT. 2, 1975. BEL. 0815632, SAF. 0743536.

3,927,026.—PROCESS OF MAKING X-FORM METAL PHTHALOCYANINE. DEC. 16, 1975. CAN. 0916703, GRB. 1312946, JAP. 0693981.

3,932,180.—DIRECT ALPHA TO X PHASE CONVERSION OF METAL-FREE PHTHALOCYANINE. JAN. 13, 1976. BEL. 0815632, SAF. 0743536.

3,932,454.—PROCESS OF MAKING HEXAGONAL ALPHA METAL-FREE PHTHALOCYANINE. JAN. 13, 1976. CAN. 0918152, GRB. 1327084, JAP. 0752724.

4,031,109.—METHOD FOR THE PREPARATION OF X-FORM METAL PHTHALOCYANINE AND X-FORM METAL FREE COMPOUNDS. JUNE 21, 1977. ARG. 0188048.

Class 18A 3

3,447,922.—ELECTRICALLY PHOTOSENSITIVE PARTICLES USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROC. JUNE 3, 1969.

3,448,028.—N-SBSTUD-8,13-DIOXODINAPHTHO-2-1-B,2,3-D-FURAN-6-CARBOXAMIDES AS ELCTLY PTOSNSTV MTLS IN ELCPHG. JUNE 3, 1969.

Class 18A 4

3,384,632.—ARYLAZO-4-ISOPROPOXY-1-NAPHTHOL COMPOUNDS. MAY 21, 1968. BEL. 0743897, CAN. 0787920, FRA. 1473703, GER. 1644400, GRB. 1145374, ITL. 0764015, JAP. 0578398.

3,574,182.—CALCIUM SALT OF 6-BROMO-1-1-SULFO-2-NAPHTHYLAZO-2-NAPHTHOL. APR. 6, 1971. ARG. 0168131, ATR. 0302812, AUS. 0429649, BEL. 0710053, CAN. 0878483, CHL. 0024254, CLB. 0018785, DNK. 0128493, FIN. 0049711, FRA. 1556484, GRB. 1197374, GRK. 0036648, IND. 0114221, ISR. 0029376, ITL. 0823989, JAP. 0605213, LXB. 0055364, MEX. 0099564, NOR. 0129593, NZL. 0151403, PRU. 0009483, PTG. 0049036, SAF. 0068559, SPN. 0349965, STZ. 0524844, SWD. 0351737, URG. 0008893, VZL. 0032776.

Class 18B

3,467,634.—ORGANOSILICON TERPOLYMERS AND PROCESS. SEPT. 16, 1969. ARG. 0165758, AUS. 0417109, BEL. 0702403, BRA. 6790950, CAN. 0857389, FRA. 1534183, GRB. 1200756, HOL. 0826202, ITL. 0826202, JAP. 0671041. MEX. 0100136, NOR. 0125392, SPN. 0343902, STZ. 0484210, SWD. 0339752, VZL. 0025437.

3,671,467.—SELENIUM CONTAINING POLYMERS. JUNE 20, 1972. ARG. 0190619, BEL. 0770689, CAN. 0941544, FRA. 7128500, GRB. 1364297, ITL. 9308410, SPN. 0393651, VZL. 0029342.

3,725,505.—PYRENE CONTAINING POLYMERS PREPARED BY ANIONIC POLYMERIZATION. APR. 3, 1973. ARG. 0183776, AUS. 0459733, BEL. 0770501, CAN. 0986650, FRA. 7127963, GRB. 1359045, ITL. 0930707, MEX. 0120152, SPN. 0393582, VZL. 0031959.

3,776,760.—METHOD FOR MANUFACTURING A TETRAFLUOROETHLENE POLYMER-COATED ROLL. DEC. 4, 1973. ARG. 0199302, ATR. 0335842, AUS. 0165141, BEL. 0789728, CAN. 0990149, GRB. 1410025, NZL. 0168554, SAF. 0727133, STZ. 0028514.

3,852,861.—SURFACES WITH FLUOROCARBON PROCESS FOR MULTIPLE COATING RESINS. DEC. 10, 1974. ARG. 0199302, ATR. 0335842, AUS. 0165141, BEL. 0789728, CAN. 0990149, GRB. 1410025, NZL. 0168554, SAF. 0727133, STZ. 0028514.

3,860,484.—ENZYME STABILIZATION. JAN. 14, 1975.

3,864,144.—PROCESS FOR PREPARATION OF PHOTOCONDUCTIVE FILMS FROM INTRACTABLE MATERIALS. FEB. 4, 1975. FRA. 7408936, GRB. 1414158, ITL. 1010695, TIW. 0008534.

3,877,936.—PHOTOCONDUCTIVE COPOLYMER OF N-VINYLCARBAZOLE AND N-VINYLPHTHALIMIDE. APR. 15, 1975. BEL. 0812436, FRA. 7409307, GRB. 1444048, ITL. 1010697, SPN. 0424411.

3,879,198.—ELECTROPHOTOGRAPHIC AMBIPOLAR PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHOD. APR. 22, 1975. FRA. 7403086, GRB. 1446966.

3,882,087.—ORGANIC PHOTOCONDUCTIVE MATERIAL. MAY 6, 1975.

3,883,488.—2-VINYL-9-DICYANOMETHYLENE-FLUORENE AND DERIVATIVES THEREOF. MAY 13, 1975.

3,884,825.—IMAGING COMPOSITION. MAY 20, 1975. AUS. 0467835, BEL. 0802879, CAN. 099593, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 0417382..

3,895,945.—PROCESS FOR PREPARATION OF A DYESTUFF SENSITIZED PHOTOCONDUCTIVE COMPOSITION. JULY 22, 1975.

3,899,328.—ACTIVE MATRIX AND INTRINSIC PHOTOCONDUCTIVE POLYMER OF A LINEAR POLYSILOXANE. AUG. 12, 1975. ITL. 1010430.

3,943,108.—PHOTOCONDUCTIVE COMPOSITION OF AN ALDEHYDE CONDENSATE. MAR. 9, 1976.

3,950,168.—FIXING POWDER IMAGES-FUSING AIDES FOR HYBRID FIX. APR. 13, 1976.

3,951,658.—COLOR MODIFYING IMAGING METHOD AND ARTICLE. APR. 20, 1976.

3,954,906.—AMBIPOLAR PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHOD. MAY 4, 1976. FRA. 7403086, GRB. 1446966.

3,965,049.—ONE-STEP SYNTHESIS OF AROMATIC ORGANIC DISELENIDES. JUNE 22, 1976.

3,967,962.—DEVELOPING WITH TONER POLYMER HAVING CRYSTALLINE AND AMORPHOUS SEGMENTS. JULY 6, 1976.

3,970,602.—COPOLYMERS OF N-VINYLCARBAZOLE AND N-VINYLPHTHALIMIDE AND DERIVATIVES THEREOF. JULY 20, 1976. BEL. 0812436. FRA. 7409307, GRB. 1444048, ITL. 1010697, SPN. 0424411.

3,994,994.—IMPROVED PROCESS FOR PREPARATION OF BLOCK COPOLYMERS FROM VINYLCARBOZOLES & OTHER ADDITION MONO. NOV. 30, 1976.

4,007,043.—PHOTOCONDUCTIVE ELEMENTS WITH COPOLYMER CHARGE TRANSPORT LAYERS. FEB. 8, 1977.

4,009,151.—POLYMERS OF 2-VINLYFLUORENONE AND DERIVATIVES THEREOF. FEB. 22, 1977.

4,011,266.—2-VINYL-FLUORENONE AND DERIVATIVES THEREOF. MAR. 8, 1977.

Class 18C 1

RE.27,480.—AUTOMATIC DEVELOPMENT CONTROLLER -RE OF 3,376,854-D986. SEPT. 19, 1972.

3,884,825.—IMAGING COMPOSITION. MAY 20, 1975. AUS. 0467835. BEL. 0802879, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 0417382.

Class 18C 1A

2,919,247.—TRIPARTITE DEVELOPER FOR ELECTROSTATIC IMAGES. DEC. 29, 1959. CAN. 0565006.

2,965,573.—XEROGRAPHIC DEVELOPER. DEC. 20, 1960. CAN. 0612918, GRB. 0934406.

3,720,617.—AN ELECTROSTATIC DEVELOPER CONTAINING MODIFIED SILICON DIOXIDE PARTICLES. MAR. 13, 1973. ARG. 0189666, ATR. 0321104, AUS. 0463862, BEL. 0767359, CAN. 0941212, CHL. 0026780, EGR. 0093928, FRA. 7118950, GRB. 1347318, ITL. 0926884, MEX. 0131403, NZL. 0163670, PNM. 0002393, PRU. 0011824, STZ. 0567746, SWD. 0366402, TIW. 0006149, USR. 0460634, VZL. 0032423.

3,819,367.—IMAGING SYSTEM. JUNE 25, 1974. ARG. 0189666, ATR. 0321104, AUS. 0463862, BEL. 0767359, CAN. 0941212, CHL. 0026780, EGR. 0093928, FRA. 7118950, GRB. 1347318, ITL. 0926884, MEX. 0131403, NZL. 0163670, PNM. 0002393, PRU. 0011824, STZ. 0567746, SWD. 0366402, TIW. 0006149. USR. 0460634, VZL. 0032423.

3,820,986.—LIQUID DEVELOPMENT METHOD AND MATERIALS. JUNE 28, 1974.

3,833,364.—METHOD OF DEVELOPING ELECTROSTATIC IMAGE CHARGE. SEPT. 3, 1974.

3,850,830.—LIQUID DEVELOPER CONTAINING EXTENDER BODY PARTICLES. NOV. 25, 1974.

3,900,588.—NON-FILMING DUAL ADDITIVE DEVELOPER. AUG. 19, 1975. BEL. 0825924, SPN. 0435074.

Class 18C 1B

3,013,890.—PROCESS OF DEVELOPING ELECTROSTATIC IMAGES AND COMPOSITION THEREFOR. DEC. 19, 1961. AUS. 0243022, CAN. 0812526, FRA. 1251476, GER. 1129511, GRB. 0944401, ITL. 0620433, JAP. 0313573.

3,577,345.—SOLID XEROGRAPHIC DEVELOPER. MAY 4, 1971. ARG. 0172448, ATR. 0325417, AUS. 0424173, BAH. 0000095, BEL. 0716084, BOL. 0032708, CAN. 0902983, CHL. 0025923, CLB. 0017674, DOR. 0001461, ELS. 0001064, FRA. 1567731, GRB. 1232117, GRK. 0037628, GUA. 0002003, HOL. 0148714, IND. 0116209, ISR. 0030116, ITL. 0851653, JAM. 0001848, JAP. 0623002, LXB. 0056197, MEX. 0119320, NOR. 0131653, NZL. 0164353, PNM. 0002062. PRU. 0009911, PTG. 0049749, SPN. 0354686, STZ. 0516180, SWD. 0338238, TIW. 0005096, TRD. 0000057, TRK. 0015620, URG. 0009286, VZL. 0023666.

3,590,000.—SOLID DEVELOPER FOR LATENT ELECTROSTATIC IMAGES. JUNE 29, 1971. ARG. 0172453, ATR. 0288860, BAH. 0000093, BEL. 0716083, BOL. 33998, CAN. 0902984, CHL. 0024050, DOR. 0001460, ECD. 0000198, ELS. 0001062, FRA. 1567721, GER. 1772570, GRB. 1232118, GRK. 0037629, GUA. 0002095, HOL. 0151523, IND. 0116210, ISR. 0030117, ITL. 0851651, JAM. 0002094, JAP. 0655407, LXB. 0056196, MEX. 0104566, NZL. 0164356, PLP. 0007690, PNM. 0002083, PRU. 0009495, PTG. 0049748, SPN. 0354685, STZ. 0519737, SWD. 0357071, TIW. 0004940, TRD. 0000058, TRK. 0015606, URG. 0009287, VZL. 0032392.

3,653,893.—IMAGING SYSTEM. APR. 4, 1972.

3,655,374.—IMAGING PROCESS EMPLOYING NOVEL SOLID DEVELOPER MATERIAL. APR. 11, 1972.

3,681,107.—DEVELOPMENT OF ELECTROSTATOGRAPHIC IMAGES. AUG. 1, 1972.

3,856,692.—LIQUID ELECTROSTOGRAPHIC DEVELOPER COMPOSITIONS. DEC. 24, 1974. CAN. 0940361, GRB. 1332674.

3,900,588.—NON-FILMING DUAL ADDITIVE DEVELOPER. AUG. 19, 1975. BEL. 0825924, SPN. 0435074.

3,900,589.—AN ELECTROSTATOGRAPHIC IMAGING PROCESS. AUG. 19, 1975. AUS. 0467835, BEL. 0802879, CAN. 0995963, FRA. 7328589, GRB. 1437041, ITL. 0991465, SPN. 0417382.
4,002,570.—ELECTROPHOTOGRAPHIC DEVELOPER WITH POLYVINYLIDENE FLUORIDE ADDITIVE. JAN. 11, 1977

Class 18C 2

4,038,076.—ELECTROSTATOGRAPHIC DEVELOPMENT. JULY 26, 1977. ARG. 0192480, AUS. 0466319, BEL. 0793098, CAN. 0985552, FRA. 7245403, GRB. 1417179, ITL. 0973327, SPN. 0410171, STZ. 0028663, SWD 7216977.

Class 18C 2A

3,723,114.—THERMOSETTING ELCTRSTGRPHC DVLPR OF CARRIER/PREPOLYMER OF DIALLYL PHTHALATE ISOPHTHALATE AND MXTR. MAR. 27, 1973. ARG. 0185089, BEL. 0762507, CAN. 0970195, FRA. 7104349, GRB. 1344197, ITL. 0918244, MEX. 0122234.
3,806,339.—LIQUID DEVELOPER COMPOSITION. APR. 23, 1974.
3,942,979.—IMAGING SYSTEM. MAR. 9, 1976.
3,965,021.—ELECTROSTATOGRAPHIC DEVELOPMENT-POLYBLEND TONERS. JUNE 22, 1976.
3,967,962.—DEVELOPING WITH TONER POLYMER HAVING CRYSTALLINE AND AMORPHOUS SEGMENTS. JULY 6, 1976.
3,969,251.—DEVELOPER MIXTURE. JULY 13, 1976.

Class 18C 2A 1

RE.25,136.—ELECTROSTATIC DEVELOPER COMPOSITION AND METHOD THEREFOR-RE OF 2,940,934-D432. MAR. 13, 1962.
2,788,288.—RHEINFRANK 0000 JJ 0000 JONES 0000 WD. APR. 9, 1957. CAN. 0550574, GRB. 0768293.
2,892,794.—ELECTROSTATIC DEVELOPER AND TONER. JUNE 30, 1959.
2,940,934.—ELECTROSTATIC DEVELOPER COMPOSITION & METHOD THEREFOR — SEE D670 FOR RE25136. JUNE 14, 1960.
3,079,342.—ELECTROSTATIC DEVELOPER COMPOSITION AND METHOD THEREFOR. FEB. 26, 1963. ARG. 0157131, CAN. 0726134, GUA. 0001817.
3,239,465.—XEROGRAPHIC DEVELOPER. MAR. 8, 1966. CAN. 0630295, GRB. 0952166.

Class 18C 2A 2

2,753,308.—XEROGRAPHY DEVELOPER COMPOSITION. JULY 3, 1956.
3,239,465.—XEROGRAPHIC DEVELOPER. MAR. 8, 1966. CAN. 0630295, GRB. 0952166.

Class 18C 2B

3,533,835.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURE. OCT. 13, 1970. ARG. 0181296, AUS. 0417746, BEL. 0704918, CAN. 0900769, CHL. 0024909, CLB. 0017825, FRA. 1540695, GRB. 1211865, IND. 0112449, ITL. 0814857, MEX. 0100137, PRU. 0009323, SWD. 0323583, URG. 0009011, VZL. 0023668.
3,591,503.—ELECTROSTATOGRAPHIC DEVELOPER. JULY 6, 1971. ARG. 0172143, ATR. 0287491, AUS. 0418556, BEL. 0713751, CAN. 0879020, CHL. 0024256, CLB. 0017933, FRA. 1560849, GRB. 1225980, GRK. 0038397, IND. 0115457, ITL. 0833710. LXB. 0055904, MEX. 0111625, NOR. 0128297, NZL. 0152196, PLP. 0008847, PRU. 0009319, PTG. 0049455, SAF. 0682386, SPN. 0352810, STZ. 0508903, SWD. 0333868, URG. 0009139, VZL. 0023688.
3,595,794.—ELECTROSTATOGRAPHIC DEVELOPER. JULY 27, 1971. ARG. 0169109, ATR. 0290986, AUS. 0418156, BEL. 0713752, CAN. 0879021, CHL. 0024482, FRA. 1582855, GRB. 1227471, IND. 0115458, ITL. 0883043, LXB. 0055894, MEX. 0115899, NOR. 0128036, NZL. 0152195, PLP. 0007966, PRU. 0009335, PTG. 0049154, SAF. 0682358, SPN. 0352811, STZ. 0505410, SWD. 0331633, URG. 0009283, VZL. 0023687.
3,627,522.—DEVELOPER COMPOSITION AND METHOD OF USE. DEC. 14, 1971.
3,672,928.—ELECTROSTATOGRAPHIC DEVELOPERS HAVING CARRIERS COMPRISING POLYSTER COATED CORES. JUNE 27, 1972. ARG. 0184669, BEL. 0762415, CAN. 0941209, FRA. 7103845, GRB. 1344365, ITL. 0918191, JAP. 0764506.
3,704,066.—REFLEX EXPOSURE MEDIUM. NOV. 28, 1972.
3,725,283.—ELECTROSTATOGRAPHIC DEVELOPER CONTAINING UNCOATED GLASS CERAMIC CARRIER PARTICLES. APR. 3, 1973. BEL. 0777720, CAN. 0973745, FRA. 7201006, GRB. 1376457, ITL. 0946358.
3,767,578.—CARRIER MATERIAL FOR ELECTROSTATOGRAPHIC. OCT. 23, 1973. ARG. 0198052, ATR. 0322978, AUS. 0461667, BEL. 0784452, CAN. 0986351, CHL. 0027640, FRA. 7220690, GRB. 1397445, ITL. 0959791, MEX. 0127643, SPN. 0403664, STZ. 0546969, SWD. 7207389, TIW. 0006042, VZL. 0032064.
3,847,604.—ELECTROSTATIC IMAGING PROCESS USING MODULAR CARRIERS. NOV. 12, 1974. ARG. 0198052, ATR. 0322978, AUS. 0461667, BEL. 0784452, CAN. 0986351, CHL. 0027640, FRA. 7220690, GRB. 1397445, ITL. 0959791, MEX. 0127643, SPN. 0403664, STZ. 0546969, SWD. 7207389, TIW. 0006042, VZL. 0032064.
3,849,127.—AN ELECTROSTATOGRAPHIC PROCESS IN WHICH COATED CARRIER PARTICLES ARE USED. NOV. 19, 1974.
3,857,792.—ELECTROSTATIC DEVELOPER MIXTURE WITH A COATED CARRIER. DEC. 31, 1974.
3,914,181.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURES COMPRISING FERRITE CARRIER BEADS. OCT. 21, 1975. ARG. 0194244, AUS. 0471676, BEL. 0785913, CAN. 1000477, GRB. 1398871, ITL. 0962400, MEX. 0126285, SPN. 0404423, VZL. 0032940.
3,923,503.—ELECTROSTATIC LATENT IMAGE DEVELOPMENT EMPLOYING STEEL CARRIER PARTICLES. DEC. 2, 1975. ARG. 0181848, ATR. 0316987, AUS. 0456820, BAH. 0000162, BEL. 0752230, CAN. 0940360, CHL. 0025833, EGR. 0095180, FRA. 7021985, GRB. 1312806, ITL. 0894287, JAP. 0728825, MEX. 0121681, NOR. 0131364, NZL. 0160479, PLD. 0081013, PNM. 0002264, PTG. 0053978, SAF. 0704155, SPN. 0380913, STZ. 0548625, SWD. 0351058, TIW. 0006837, USR. 0457235.
3,939,086.—HIGHLY CLASSIFIED OXIDIZED DEVELOPER MATERIAL. FEB. 17, 1976. ARG. 0181848, ATR. 0316987, AUS. 0456820, BAH. 0000162, BEL. 0752230, CAN. 0940360, CHL. 0025833, EGR. 0095180, FRA. 7021985, GRB. 1312806, ITL. 0894287, JAP. 0728825, MEX. 0121681, NOR. 0131364, NZL. 0160479, PLD. 0081013, PNM. 0002264, PTG. 0053978, SAF. 0704155. SPN. 0380913, STZ. 0548625, SWD. 0351058, TIW. 0006837, USR. 0457235.
3,942,979.—IMAGING SYSTEM. MAR. 9, 1976.
3,969,251.—DEVELOPER MIXTURE. JULY 13, 1976.
4,018,601.—ELECTROSTATOGRAPHIC MAGNETIC BRUSH IMAGING PROCESS EMPLOYING CARRIER BEADS COMPRISING HIGH NICK. APR. 19, 1977.

Class 18C 3

2,891,011.—DEVELOPER FOR ELECTROSTATIC IMAGES. JUNE 16, 1959.

Class 18C 4

3,467,634.—ORGANOSILICON TERPOLYMERS AND PROCESS. SEPT. 16, 1969. ARG. 0165758, AUS. 0417109, BEL. 0702403, BRA. 6790950, CAN. 0857389, FRA. 1534183, GRB. 1200756, HOL. 0826202, ITL. 0826202, JAP. 0671041, MEX. 0100136, NOR. 0125392, SPN. 0343902, STZ. 0484210, SWD. 0339752, VZL. 0025437.
3,526,533.—COATED CARRIER PARTICLES. SEPT. 1, 1970. ARG. 0161341, AUS. 0418867, BEL. 0702404, CAN. 0878413, FRA. 1534184, GRB. 1205051, ITL. 0826203, JAP. 0578401, MEX. 0120334, NOR. 0122818, SPN. 0343903, STZ. 0486054, SWD. 0308987, VZL. 0032393.
3,533,835.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURE. OCT. 13, 1970. ARG. 0181296, AUS. 0417746, BEL. 0704918, CAN. 0900769, CHL. 0024909, CLB. 0017825, FRA. 1540695, GRB. 1211865, IND. 0112449, ITL. 0814857, MEX. 0100137, PRU. 0009323, SWD. 0323583, URG. 0009011, VZL. 0023668.
3,713,819.—XEROGRAPHIC IMAGING AND DEVELOPMENT USING METAL OXIDE CARRIER PART. JAN. 30, 1973.
3,730,707.—METHOD OF DEVELOPING LATENT IMAGES. MAY 1, 1973.
3,752,666.—ELECTROSTATIC IMAGING PROCESS USING CARRIER BEADS CONTAINING CONDUCTIVE PARTICLES. AUG. 14, 1973.
3,839,029.—ELECTROSTATOGRAPHIC DEVELOPMENT WITH FERRITE DEVELOPER MATERIALS. OCT. 1, 1974. ARG. 0194244, AUS. 0471676, BEL. 0785913, CAN. 1000477, GRB. 1398871, ITL. 0962400, MEX. 0126285, SPN. 0404423, VZL. 0032940.

3,849,182.—HIGHLY SHAPE-CLASSIFIED OXIDIZED LOW CARBON HYPEREUTECTOID ELECTROSTATOGRAPHIC STEEL CARRIER PA. NOV. 19, 1974. ARG. 0181848, ATR. 0316987, AUS. 0456820, BAH. 0000162, BEL. 0752230, CAN. 0940360, CHL. 0025833, EGR. 0095180, FRA. 7021985, GRB. 1312806, ITL. 0894287, JAP. 0728825, MEX. 0121681, NOR. 0131364, NZL. 0160479, PLD. 0081013, PNM. 0002264, PTG. 0053978. SAF. 0704155, SPN. 0380913, STZ. 0548625, SWD. 0351058, TIW. 0006837, USR. 0457235.

3,850,663.—CELLULOSE COATED CARRIERS. NOV. 26, 1974. ARG. 0183677, AUS. 0458322, BEL. 0763987, CAN. 0941210, EGR. 0091603, FRA. 7108585, GRB. 1345027, ITL. 0922292, MEX. 0120027, PNM. 0002440, SAF. 0711547, STZ. 0557050, SWD. 0359940, TIW. 0008177, VZL. 0032931.

3,850,676.—COATED CARRIER PARTICLES FOR ELECTROSTATOGRAPHIC DEVELOPMENT. NOV. 26, 1974.

3,856,519.—TRANSFER OF TONER USING A VOLATILE INSULATING LIQUID. DEC. 24, 1974.

3,900,587.—IMAGING PROCESS EMPLOYING TREATED CARRIER PARTICLES. AUG. 19, 1975. CAN. 1007923.

3,916,064.—DEVELOPER MATERIAL. OCT. 28, 1975.

3,916,065.—ELECTROSTATOGRAPHIC CARRIER PARTICLES. OCT. 28, 1975.

3,989,648.—IMAGING SYSTEM. NOV. 2, 1976. CAN. 1007923.

4,019,903.—ELECTROSTATIC DEVELOPMENT. APR. 26, 1977. BEL. 0777715, CAN. 0973746, FRA. 7201001, GRB. 1376456, ITL. 0946359.

4,035,520.—IMAGING SYSTEMS. JULY 12, 1977

Class 18C 5

3,788,994.—PRESSURE FIXABLE ELECTROSTATOGRAPHIC TONER. JAN. 29, 1974. ARG. 0200575, BEL. 0793247, CAN. 0985943, FRA. 7244381, GRB. 1406687, ITL. 0973323, SPN. 0410212, STZ. 0028529, VZL. 0032608.

3,804,764.—ELECTROSTATOGRAPHIC PRESSURE SENSITIVE POLYMERIC TONER. APR. 16, 1974. ARG. 0196320, AUS. 0464392, BEL. 0793554, CAN. 1011149, FRA. 7246575, GRB. 1417409, ITL. 0973325, SPN. 0410211, STZ. 0028568.

3,853,778.—TONER COMPOSITION EMPLOYING POLYMER WITH SIDE CHAIN CRYSTALLINITY. DEC. 10, 1974. AUS. 0465653, BEL. 0793639, CAN. 0998869, FRA. 7246888, GRB. 1423291, ITL. 0973330, SPN. 0410267, SWD. 7300003.

3,893,932.—PRESSURE FIXABLE TONER. JULY 8, 1975.

3,893,934.—SOLID DEVELOPER FOR ELECTROSTATIC LATENT IMAGES. JULY 8, 1975.

3,910,846.—METHOD OF PREPARING ELECTROSCOPIC TONER PARTICLES. OCT. 7, 1975. CAN. 0984074.

3,974,078.—AN ELECTROSTATE GRAPHIC DEVELOPMENT OF ENCAPSULATED MATERIALS. AUG. 10, 1976. ARG. 0196318, AUS. 0467046, BEL. 0792115, CAN. 1001884, FRA. 7239134, ITL. 0973326, MEX. 0128788, SPN. 0410205, STZ. 0028567, VZL. 0033139.

4,002,776.—IMAGING PROCESS EMPLOYING TONER PARTICLES CONTAINING ARYLSULPONAMIDE FORMALDEHYDE ADDUCT. JAN. 11, 1977.

Class 18C 5A

3,345,293.—COLORED ELECTROSTATOGRAPHIC TONERS CONTAINING ORGANIC DYE PIGMENTS. OCT. 3, 1967. CAN. 0834674, GRB. 1074147, JAP. 0788652.

3,864,125.—ELECTROPHOTOGRAPHIC METHOD OF MAKING AN IMAGING MASTER. FEB. 4, 1975.

3,897,249.—TONERS FOR PHTHALOCYANINE PHOTORECEPTORS. JULY 29, 1975.

Class 18C 5B

3,080,250.—SELF-TACKIFYING XEROGRAPHIC TONER. MAR. 5, 1963.

3,080,318.—THREE-COMPONENT XEROGRAPHIC TONER. MAR. 5, 1963.

Class 18C 6

3,755,177.—PROCESS OF MAKING LIQUID ELECTROSTATIC DEVELOPERS CONTAINING GELATIN. AUG. 28, 1973.

3,790,485.—PROCESS FOR PRODUCING ELECTROPHOTOGRAPHIC LIQUID DEVELOPER. FEB. 5, 1974.

3,812,037.—LIQUID DEVELOPER COMPOSITION. MAY 21, 1974.

Class 18C 6A

3,507,686.—METHOD OF COATING CARRIER BEADS. APR. 21, 1970. CAN. 0872190, GRB. 1239621, JAP. 0675782.

3,658,500.—METHOD OF PRODUCING GLASS BEADS FOR ELECTROSTATOGRAPHIC DEVELOPERS. APR. 25, 1972. CAN. 0916536, GRB. 1331485.

3,685,113.—DEVELOPER SYSTEM. AUG. 22, 1972. ARG. 0183679, BEL. 0764635, CAN. 0941211, FRA. 7110751, GRB. 1347568, ITL. 0922132, MEX. 0122432.

3,764,310.—METHOD OF PRODUCING ELECTROSTATOGRAPHIC DEVELOPER. OCT. 9, 1973.

3,789,796.—APPARATUS FOR PRODUCING DEVELOPER MATERIALS. FEB. 5, 1974.

3,908,046.—P-XYLYENE VAPOR PHASE POLYMERIZATION COATING OF ELECTROSTATOGRAPHIC PARTICLES. SEPT. 23, 1975.

3,940,514.—METHOD OF COATING ELECTROSTATOGRAPHIC CARRIER PARTICLES. FEB. 24, 1976.

Class 18C 6B

3,326,848.—SPRAY DRIED LATEX TONERS. JUNE 20, 1967. AUS. 0409084, BEL. 0666056, CAN. 0866260. FRA. 1451366, GRB. 1115653, ITL. 0717377, MEX. 0088140, SWD. 0340046.

3,338,991.—METHOD OF FORMING ELECTROSTATIC TONER PARTICLES. AUG. 29, 1967. FRA. 1450642, GRB. 1115634, HOL. 0142251, ITL. 0717378, JAP. 0539572.

3,502,582.—IMAGING SYSTEMS. MAR. 24, 1970. ARG. 0171952, BEL. 0726571, CAN. 0873934, FRA. 1569382, GRB. 1237095, ITL. 0835554, MEX. 0100704, VZL. 0032414.

3,740,334.—PROCESS OF PREPARING SOLID DEVELOPERS FOR ELECTROSTATIC LATENT IMAGES. JUNE 19, 1973.

3,830,750.—ENCPSLTNG SBSTNLY SLUBL PRTN OF CORE MATL IN SBSTNLY SLBLE SHELL MATL OF DFRNT SOLUBLTY. AUG. 20, 1974. AUS. 0466018, BEL. 0793246, CAN. 0983328, GRB. 1411954, ITL. 0973317, SPN. 0410224, STZ. 0028527.

3,936,517.—METHOD FOR REDUCING PARTICLE SIZE. FEB. 3, 1976.

4,016,099.—METHOD OF FORMING ENCAPSULATED TONER PARTICLES. APR. 5, 1977.

Class 18D

3,150,446.—BRAZING METHOD AND COMPOSITION. SEPT. 29, 1964.

3,666,429.—MATALLIZED AND BRAZED CERAMICS. MAY 30, 1972.

3,959,934.—COMPOSITION AND METHOD FOR REPAIRING SELENIUM PHOTORECEPTOR. JUNE 1, 1976.

3,971,169.—A METHOD FOR REPAIRING SELENIUM PHOTOCONDUCTORS. JULY 27, 1976.

Class 18E

3,950,168.—FIXING POWDER IMAGES-FUSING AIDES FOR HYBRID FIX. APR. 13, 1976.

4,025,541.—CHARGE TRANSFER OF FERROCENES HAVING LIGHT FILTERING PROPERTIES. MAY 24, 1977.

Class 20

3,916,167.—COUNTERS. OCT. 28, 1975.

Class 20A

3,751,693.—MOVING COIL MOTOR WITH NO SPRAY FLUX. AUG. 7, 1973. AUS. 3467604, BEL. 0795400, CAN. 0980395, GRB. 1424622, ITL. 0979062, SPN. 0411470.

3,769,467.—VIBRATION DAMPED TRANSDUCER HEAD ASSEMBLY. OCT. 30, 1973. ARG. 0195905, AUS. 0476996, BEL. 0795401, CAN. 0995355, GRB. 1417764, ITL. 0979063, MEX. 0135598, SPN. 0411538, STZ. 0558582, SWD. 7301915.

Class 20A 1

RE.27,313.—BELT TRACKING SYSTEM - RE OF 3,500,694-D2586. MAR. 21, 1972.

3,435,693.—BELT TRACKING DEVICE. APR. 1, 1969. ARG. 0168295, ATR. 0283116, AUS. 0421893, BEL. 0705641, CAN. 0853440, CHL. 0023084, CLB. 0017528, DNK. 0117047, FRA. 1543079, GRB. 1180659, ITL. 0827782,

MEX. 0100320, NOR. 0124530, PRU. 0009336, SAF. 0676414, SPN. 0346430, STZ. 0471736, URG. 0009729, USR. 0321984, VZL. 0023676.
3,500,694.—BELT TRACKING SYSTEM — SEE D3286 FOR RE27313. MAR. 17, 1970.
3,592,071.—BELT TRACKING APPARATUS. JULY 13, 1971. ARG. 0179666, BEL. 0751117, CAN. 0925118, FRA. 7019040, GRB. 1298926, ITL. 0893540, JAP. 0770135, MEX. 0118981, SPN. 0380136.
3,593,838.—CONVEYOR BELT. JULY 20, 1971. CAN. 0883720.

Class 20A 2

2,022,891.—PHOTOCOPY MACHINE. DEC. 3, 1935.
3,498,148.—CHAIN TRAIN. MAR. 3, 1970.
3,509,780.—DOUBLE-ACTION ROTARY SOLENOID DRIVE MECHANISM. MAY 5, 1970.
3,844,179.—GEAR DRIVE FOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. OCT. 29, 1974. ARG. 203483, BEL. 0816382, CAN. 1007075, GRB. 1467714, STZ. 5786990, VZL. 0033061.
3,982,831.—ELECTROSTATOGRAPHIC REPRODUCTION APP & DRIVE THEREFOR. SEPT. 28, 1976
3,985,277.—WEB HANDLING DEVICE. OCT. 12, 1976.

Class 20A 3

2,069,318.—PHOTOCOPY MACHINE. FEB. 2, 1937.
3,405,564.—PULLEY. OCT. 15, 1968. CAN. 0850353.
3,505,716.—ROLL APPARATUS. APR. 14, 1970.
3,791,243.—METHOD AND APPARATUS FOR FORMING EDGES OF AN ENDLESS BELT. FEB. 12, 1974.
3,932,177.—COLLAR AND METHOD OF MAKING SAME. JAN. 13, 1976.

Class 20A 4

3,329,029.—OFF-CENTER LOAD MOVING ASSEMBLY. JULY 4, 1967.
3,337,072.—LOADER. AUG. 22, 1967. CAN. 0825092, GRB. 1166619, JAP. 0605648.
3,493,269.—LOADING HEAD. FEB. 3, 1970. CAN. 0864392.
3,777,578.—LINEAR ACTUATOR. DEC. 11, 1973. CAN. 9783901.

Class 20A 5

2,025,371.—APPARATUS FOR TREATING PHOTOGRAPHIC FILM. DEC. 24, 1935.
3,112,819.—CLUTCH MECHANISM - 914. DEC. 3, 1963. CAN. 0688810.
3,213,645.—TORQUE LIMITING MECHANISM. OCT. 26, 1965. CAN. 0729978, GRB. 1035547, JAP. 0548690.
3,623,680.—CLUTCH/BRAKE MECHANISM. NOV. 30, 1971.
3,686,974.—MECHANICAL DRIVE ARRANGEMENT. AUG. 29, 1972.

Class 20A 6

3,351,831.—MOTOR SPEED CONTROL UTILIZING LIGHT SENSITIVE CONDUCTIVE AND RESISTIVE ELEMENTS. NOV. 7, 1967.
3,388,875.—WEB TRANSPORT CONTROL ASSEMBLY. JUNE 18, 1968.
3,418,046.—SIGNAL STORAGE DEVICE. DEC. 24, 1968. CAN. 0852814, GER. 1524999, GRB. 1190084, JAP. 0589515.
3,552,221.—SPEED CONVERTING MECHANISM. JAN. 5, 1971.
3,858,777.—PRINTING APPARATUS INCLUDING REGISTRATION CONTROL. JAN. 7, 1975.
3,870,934.—WEB TENSION CONTROLLER. MAR. 11, 1975.
3,909,125.—STEPPER MOTOR CONTROL. SEPT. 30, 1975.
3,917,400.—METHOD & APPARATUS FOR MAINTAINING A PREDETERMINED PHASE RELATIONSHIP BETWEEN TWO SIGNALS. NOV. 4, 1975.
3,921,043.—METHOD & APPARATUS FOR MAINTAINING SUBSTANTIALLY CONSTANT TORQUE IN A WEB TRANSPORT APPARATUS. NOV. 18, 1975.
3,944,896.—PHASE SYNCHRONIZATION SYSTEM WITH START-UP SEQUENCING AND AUTOMATIC SHUTDOWN. MAR. 16, 1976.
3,991,355.—STEPPER MOTOR CONTROL NOV. 9, 1976.

Class 20B

3,869,896.—ROLLING PROCESS. MAR. 11, 1975. GRB. 1434131.
3,942,349.—CROWN DIE FOR THREAD ROLLING OF APPLICATOR ROLLS. MAR. 9, 1976.
3,965,861.—SEPARATED ROLLER LIQUID DEVELOPMENT. JUNE 29, 1976.

Class 20B 1

2,843,295.—POWDER CLOUD GENERATOR. JULY 15, 1958.
2,862,646.—POWDER PARTICLE AEROSOL GENERATOR. DEC. 2, 1958.
2,878,972.—ROUGH SURFACE POWDER CLOUD GENERATION. MAR. 24, 1959.
2,935,234.—POWDER CLOUD GENERATING APPARATUS. MAY 3, 1960. CAN. 0655160, GRB. 0957862.
3,094,248.—XEROGRAPHIC DEVELOPING APPARATUS. JUNE 18, 1963. CAN. 0678004, GRB. 0985306.
3,129,850.—POWDER CLOUD GENERATING APPARATUS. APR. 21, 1964. CAN. 0693933, GER. 1497044, GRB. 1001237, JAP. 0436042.

Class 20B 2

2,859,129.—PROCESS FOR DEVELOPING ELECTROSTATIC IMAGES AND APPARATUS THEREFOR. NOV. 4, 1958.
3,094,248.—XEROGRAPHIC DEVELOPING APPARATUS. JUNE 18, 1963. CAN. 0678004, GRB. 0985306.
3,122,455.—XEROGRAPHIC TONER DISPENSER. FEB. 25, 1964.
3,356,248.—CONTAINER WITH A ROTATABLE CLOSURE. DEC. 5, 1967. CAN. 0825091, GRB. 1166618.
3,477,568.—ELECTROSTATIC SEPARATION OF ROUND AND NONROUND PARTICLES. NOV. 11, 1969.
3,478,600.—PARTICLE SIZE AND DISTRIBUTION ANALYZING APPARATUS. NOV. 18, 1969. CAN. 0871819, GRB. 1196449, JAP. 0667702.
3,694,068.—ROLLER RETRACTION MECHANISM IN A MULTIPLE ROLLER BELT ASSEMBLY. SEPT. 26, 1972. CAN. 0946322, GRB. 1370798.
3,698,540.—WEB SENSING MECHANISM FOR TRACKING SYSTEM. OCT. 17, 1972. CAN. 0946926.
3,702,131.—BELT TRACKING SYSTEM. NOV. 7, 1972. ARG. 1949380, AUS. 0459379, BEL. 0777321, CAN. 0953673, FRA. 7147892, GRB. 1381720, ITL. 0944435, MEX. 0126336, PNM. 0002633, SPN. 0398380.
3,740,288.—METHOD OF PREPARING A TONER DISPENSER. JUNE 19, 1973.
3,840,879.—EXCESS TONER SHIELD FOR ELECTROGRAPHIC APPARATUS. OCT. 8, 1974.
3,931,792.—ABRASIVE LIQUID DEVELOPING APPARATUS. JAN. 13, 1976.

Class 20B 3

3,410,060.—XEROGRAPHIC FILTER APPARATUS. NOV. 12, 1968. CAN. 0810976, FRA. 1458648, GRB. 1114505, ITL. 0729638, JAP. 0724232.
3,570,224.—FILTER FOR ELECTROSTATOGRAPHIC DEVELOPER. MAR. 16, 1971.
3,662,884.—METHOD AND APPARATUS FOR ELECTROSTATICALLY CLASSIFYING TONER PARTICLES. MAY 16, 1972. CAN. 0956273, GRB. 1327942.
3,740,735.—AIR CIRCULATION APPARATUS. JUNE 19, 1973. CAN. 1014265, GRB. 1322612, JAP. 0840915.
3,909,383.—CLEANING PROCESS. SEPT. 30, 1975. CAN. 0905883.

Class 20 C

1,928,106.—SPRING TENSION DEVICE. SEPT. 26, 1933.
3,698,540.—WEB SENSING MECHANISM FOR TRACKING SYSTEM. OCT. 17, 1972. CAN. 0946926.

Class 20C 1

3,498,500.—LEVEL SENSOR. MAR. 3, 1970. CAN. 0912851, GRB. 1251128, JAP. 0663856.
3,520,445.—DIELECTRIC LEVEL SENSOR. JULY 14, 1970. CAN. 0895527, GRB. 1239856, JAP. 0663857.

Class 20C 2

3,357,249.—TEMPERATURE SENSOR. DEC. 12, 1967. CAN. 0810332, GER. 1690654, GRB. 1171381.
3,723,980.—TEMPERATURE COMPENSATION SYSTEM FOR MAGNETIC DISK MEMORY UNIT. MAR. 27, 1973. ARG. 0195985, AUS. 0471633, BEL. 0791363, FRA. 7240560, GRB. 1408778, ITL. 0970913, MEX. 0129694, SPN. 0408629, STZ. 0028456, SWD. 7214693, VZL. 0032424.

Class 20C 3

3,492,732.—WEB QUANTITY INDICATOR. FEB. 3, 1970. CAN. 0887178.

Class 20C 4

3,191,440.—PRESSURE GAUGE INSTRUMENT. JUNE 29, 1965.
3,249,760.—PRESSURE GAUGE INSTRUMENT. MAY 3, 1966.
3,907,421.—TRANSFER APPARATUS FOR ELECTROSTATIC REPRODUCING MACHINES. SEPT. 23, 1975.

Class 20C 5

3,216,247.—WIND-MEASURING METER DEVICE. NOV. 9, 1965.

Class 20C 6

3,502,163.—EQUAL ARM BALANCE WITH C-SHAPED FULCRUM SLEEVE FORMED ON BEAM. MAR. 24, 1970.
3,583,505.—SPRING SCALE. JUNE 8, 1971. CAN. 0902123, GRB. 1295477.
3,878,358.—DIGITAL POWER CONTROL. APR. 15, 1975.

Class 20C 7

2,558,773.—APPARATUS FOR CONTROLLING THE THICKNESS OF A COATING ON A TRAVELING WEB. JULY 3, 1951.
3,396,965.—SENSOR GAUGE. AUG. 13, 1968. CAN. 0822218, GRB. 1152538, JAP. 0587326.

Class 20D

2,179,164.—ATTACHMENT FOR PHOTOCOPY MACHINES. NOV. 7, 1939.
2,429,896.—LENS ADJUSTING MEANS FOR PHOTOCOPY MACHINES. NOV. 11, 1947.
3,746,502.—EVAPORATION CRUCIBLE. JULY 17, 1973. GRB. 1411236.
3,765,638.—SUCTION MOUNT. OCT. 16, 1973.
3,765,757.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. OCT. 16, 1973. BEL. 0793551, CAN. 1004289, GRB. 1419978, ITL. 0972846, SPN. 0410107.

Class 20D 1

1,962,050.—ATTACHMENT FOR PHOTOGRAPHIC PRINT TREATING APPARATUS. JUNE 5, 1934.
1,977,753.—FILM TREATING APPARATUS. OCT. 23, 1934.
1,992,492.—PHOTOCOPY MACHINE. FEB. 26, 1935.
1,998,324.—PHOTOCOPY MACHINE. APR. 16, 1935.
2,019,788.—PHOTOCOPY MACHINE. NOV. 5, 1935.
2,035,558.—PHOTOCOPY MACHINE. MAR. 31, 1936.
2,050,956.—PHOTOCOPY MACHINE. AUG. 11, 1936.
2,163,451.—COPY HOLDER FOR PHOTOCOPY MACHINES. JUNE 20, 1939.
2,223,767.—MACHINE FOR FEEDING PHOTOGRAPHIC PAPER. DEC. 3, 1940.
2,430,687.—PAPER FEEDING MECHANISM FOR PHOTOCOPY MACHINES. NOV. 11, 1947.
2,956,804.—VACUUM FEED ASSEMBLY FOR FLAT PIECES. OCT. 18, 1960.
3,379,855.—FLUID FEED SYSTEM. APR. 23, 1968.
3,407,018.—TWO-AXIS ANGULAR POSITIONING APPARATUS FOR ADJUSTING THE POSITION OF AN OPTICAL ELEMENT. OCT. 22, 1968.
3,436,071.—WORK HOLDER. APR. 1, 1969. CAN. 0856095, GRB. 1174795, JAP. 0642773.
3,440,859.—CORNER FORMING APPARATUS. APR. 29, 1969. CAN. 0866532.
3,475,936.—TRANSPORT SYSTEM. NOV. 4, 1969. GRB. 1179749.
3,867,027.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. FEB. 18, 1975. BEL. 0793551, CAN. 1004289, GRB. 1419978, ITL. 0972846, SPN. 0410107.
3,869,896.—ROLLING PROCESS. MAR. 11, 1975. GRB. 1434131.
3,901,647.—LOW RADIATION OPEN-BOAT CRUCIBLES. AUG. 26, 1975.
4,016,470.—TRANSDUCER BORING SYSTEM. APR. 5, 1977.
4,018,414.—HOLDING FIXTURES. APR. 19, 1977.

Class 20D 2

3,056,967.—FASTENER DRIVING TOOL. OCT. 9, 1962.
3,091,578.—MECHANICAL BONDING LOCK. MAY 28, 1963.
3,341,681.—XEROGRAPHIC PLATE FABRICATION. SEPT. 12, 1967. CAN. 0780598, FRA. 1415795, GRB. 1070555, HOL. 0144068, IND. 0094992, ITL. 0738063.
3,876,317.—LATCH MECHANISM. APR. 8, 1975. CAN. 1005486.

Class 20D 3

3,258,281.—HERMETIC SEALED COUPLING FOR CONDUITS. JUNE 28, 1966.
3,317,224.—FLANGED PIPE COUPLING HAVING METALLIC SEAL MEANS. MAY 2, 1967.
3,366,343.—DEVICE FOR FASTENING A SHAFT TO A REEL. JAN. 30, 1968.
3,604,737.—METHOD OF JOINING MATERIALS. SEPT. 14, 1971.

Class 20D 4

3,532,863.—DYNAMIC CAM TESTER. OCT. 6, 1970. CAN. 0835529.
3,843,233.—ALIGNING AGENT FOR LOWRNG THRSHLD VOLTG REQUIRD TO EFFECT OPTCLY NEQTV TO OPTCLY POSITIVE PHASE. OCT. 22, 1974.

Class 20D 5

3,596,316.—BLOW MOLDING APPARATUS. AUG. 3, 1971.

Class 20D 6

3,384,107.—BAKEABLE VACUUM VALVE. MAY 21, 1968.

Class 20D 7

3,489,463.—BRUSH SIZING APPARATUS. JAN. 13, 1970. GRB. 1243233, JAP. 0810578.

Class 20E

3,217,328.—ANTENNA WITH WIRE MESH REFLECTOR COLLAPSING IN A PINWHEEL MANNER. NOV. 9, 1965.

Class 20F

3,390,693.—PURE FLUID AMPLIFIER. JULY 2, 1968.
3,413,993.—FLUID DEVICE. DEC. 3, 1968.
3,417,770.—FLUID AMPLIFIER SYSTEM. DEC. 24, 1968.
3,459,205.—MAGNETICALLY CONTROLLED FLUID AMPLIFIER. AUG. 5, 1969.
3,496,955.—ELECTRICALLY ACTUATED BISTABLE FLUID AMPLIFIER. FEB. 24, 1970.
3,726,588.—WEB TRACKING SYSTEM. APR. 10, 1973.

Class 20 G

3,217,328.—ANTENNA WITH WIRE MESH REFLECTOR COLLAPSING IN A PINWHEEL MANNER. NOV. 9, 1965.
3,549,059.—TRIGGERING APPARATUS AND WORK LOCATING MEANS FOR AEROSOL SPRAY CANS. DEC. 22, 1970.
3,555,725.—SELF-TRAVELLING WHEEL. JAN. 19, 1971. CAN. 0900718, GRB. 1289331, JAP. 0713807.
3,688,415.—VIBRATION DEMONSTRATION. SEPT. 5, 1972.
3,747,589.—REACTION TIME TESTING APPARATUS. JULY 24, 1973.
3,818,391.—TRACKING ASSEMBLY FOR AN ENDLESS BELT ELECTROSTATOGRAPHIC MACHINE. JUNE 18, 1974. CAN. 1010107.
3,840,879.—EXCESS TONER SHIELD FOR ELECTROGRAPHIC APPARATUS. OCT. 8, 1974.
3,907,421.—TRANSFER APPARATUS FOR ELECTROSTATIC REPRODUCING MACHINES. SEPT. 23, 1975.
3,941,006.—FREE FLOATING BELT TENSIONER. MAR. 2, 1976.
3,946,920.—VACUUM SYSTEM CONTROL. MAR. 30, 1976.
3,982,753.—COMBINED BACKSTOP & BRAKE-COMBINED BACKSTOP & BRAKE FOR ALBERT. SEPT. 28, 1976. BEL. 0812180, CAN. 1004161, FRA. 7407806, GRB. 1443088.
3,994,053.—DRUM SUPPORT APPARATUS. NOV. 30, 1976.

Class 21

D.240,557.—TRAY RACK. JULY 13, 1976.
3,942,349.—CROWN DIE FOR THREAD ROLLING OF APPLICATOR ROLLS. MAR. 9, 1976.

Class 21A

3,905,400.—ELECTROFORMING MANDREL. SEPT. 16, 1975.

Class 21A 1

3,316,158.—FOAM METAL CONSTRUCTION AND A METHOD FOR MAKING IT. APR. 25, 1967.
3,378,469.—ELECTROFORMING TECHNIQUE AND STRUCTURE FOR REFLECTING MIRRORS. APR. 16, 1968.
3,428,533.—HIGH QUALITY SUB-MASTERS AND METHOD FOR PRODUCING THEM. FEB. 18, 1969.
3,472,679.—COATING SURFACES. OCT. 14, 1969. CAN. 0896992.
3,505,177.—ELECTROFORMING PROCESS. APR. 7, 1970.
3,520,780.—MAGNESIUM ELECTRODEPOSITION. JULY 14, 1970.
3,844,906.—DYNAMIC BATH CONTROL PROCESS. OCT. 29, 1974. BEL. 0799236, FRA. 7316539, GRB. 1421818.
3,853,614.—CYCLIC RECORDING SYSTEM BY THE USE OF AN ELASTOMER IN AN ELECTRIC FIELD. DEC. 10, 1974. ARG. 0196734, AUS. 0461213, BEL. 0777320, CAN. 0953990, FRA. 7147891, GRB. 1380057, ITL. 0944392, MEX. 0131400, SPN. 0398306.
3,876,510.—PROCESS FOR ELECTROFORMING A FLEXIBLE BELT. APR. 8, 1975.
3,905,685.—ZOOM LENS FOR FIXED CONJUGATES. SEPT. 16, 1975. CAN. 0995039, GRB. 1451781.
3,954,568.—ELECTROFORMING AN ENDLESS FLEXIBLE SEAMLESS XEROGRAPHIC BELT. MAY 4, 1976. ARG. 0185811, AUS. 0449005, BEL. 0762249. CAN. 0889781, EGR. 0094306, FRA. 7103844, GRB. 1288717, HUN. 0169866, ITL. 0918048, MEX. 0119465, PLD. 0081712, PNM. 0002384, SPN. 0387636, STZ. 0521612, SWD. 0360753, TIW. 0007843, VZL. 0027666.
3,959,109.—METHOD AND APPARATUS FOR ELECTROFORMING. MAY 25, 1976.
3,963,587.—PROCESS FOR ELECTROFORMING NICKEL FOILS. JUNE 15, 1976.

Class 21A 2

3,316,158.—FOAM METAL CONSTRUCTION AND A METHOD FOR MAKING IT. APR. 25, 1967.
3,378,469.—ELECTROFORMING TECHNIQUE AND STRUCTURE FOR REFLECTING MIRRORS. APR. 16, 1968.
3,428,533.—HIGH QUALITY SUB-MASTERS AND METHOD FOR PRODUCING THEM. FEB. 18, 1969.
3,577,323.—HIGH QUALITY SUBMASTERS. MAY 4, 1971.
3,927,463.—METHOD OF MAKING A CYLINDRICALLY SHAPED, HOLLOW ELECTROFORMING MANDREL. DEC. 23, 1975.
3,950,839.—ELECTROFORMING MANDREL. APR. 20, 1976.

Class 21A 3

3,352,482.—ION SPUTTER PUMPING COLLECTOR. NOV. 14, 1967.
3,437,568.—APPARATUS AND METHOD FOR DETERMINING AND CONTROLLING STRESS IN AN ELECTROFORMED PART. APR. 8, 1969.
3,799,859.—ELECTROFORMING SYSTEM. MAR. 26, 1974. GRB. 1427544.

Class 21B

3,223,878.—METHOD OF FABRICATING FINE GRIDS. DEC. 14, 1965.
3,276,919.—PROCESS FOR FORMING METAL STRUCTURES HAVING VERY FINE PORES. OCT. 4, 1966.
3,360,347.—PRODUCTION OF POUROUS MATERIALS. DEC. 26, 1967.
3,494,748.—OXIDATION RESISTANT COATING AND ARTICLE. FEB. 10, 1970.
3,666,429.—MATALLIZED AND BRAZED CERAMICS. MAY 30, 1972.
3,703,306.—METHOD OF HERMETICALLY SEALING SILICON TO A LOW EXPANSION ALLOY. NOV. 21, 1972.
3,740,830.—BRAZING CERAMICS. JUNE 26, 1973.
3,825,724.—WRAP ADJUST DEVICE FOR CONTROLLING ENGAGEMENT BETWEEN A WEB AND ROLLER. JULY 23, 1974. CAN. 0995295, GRB. 1406047.
3,851,985.—COLLAR AND METHOD OF MAKING SAME. DEC. 3, 1974.
3,885,923.—GENERATION OF CURVED SURFACES ON A WORKPIECE. MAY 27, 1975.
3,911,163.—SOLDER COATING PROCESS AND APPARATUS. OCT. 7, 1975.

Class 21C

3,653,885.—PROCESS OF STABILIZING A MIGRATION IMAGE COMPRISING SELENIUM PARTICLES. APR. 4, 1972. CAN. 0937437.

Class 22

D244,280.—SORTER WITH BIN INDICATOR. MAY 10, 1977.

Class 22A

2,771,002.—APPARATUS FOR USE WITH XEROGRAPHIC X-RAY POWDER IMAGES. NOV. 20, 1956. CAN. 0545947.
3,473,388.—ISOKINETIC PARTICLE SAMPLER. OCT. 21, 1969. CAN. 0852475, GRB. 1194569.
3,478,600.—PARTICLE SIZE AND DISTRIBUTION ANALYZING APPARATUS. NOV. 18, 1969. CAN. 0871819, GRB. 1196449, JAP. 0667702.
3,544,458.—METHOD OF FILTERING. DEC. 1, 1970. CAN. 0888335.
3,940,997.—APPARATUS AND METHOD FOR MEASURING ANGLE OF REPOSE. MAR. 2, 1976.

Class 22B

3,938,993.—XEROGRAPHIC METHOD FOR MAKING A RESPONSIVE ANSWER SYSTEM. FEB. 17, 1976. CAN. 0858780, GRB. 1235941, JAP. 0688426.
3,972,715.—PARTICLE ORIENTATION IMAGING SYSTEM. AUG. 3, 1976.

Class 22B 1

3,497,320.—AUTOMATED CHEMICAL ANALYZER - FLEXIBLE POD SYSTEM. FEB. 24, 1970. ARG. 0182336, ATR. 0308052, AUS. 0419707, BEL. 0722723, CAN. 0917546, FIN. 0050909, FRA. 1578476, GER. 1673342, GRB. 1218748, IND. 0113632, ITL. 0856573, LXB. 0057970, MEX. 0112299, NOR. 0131258, NZL. 0164681, PNM. 0001771, SAF. 0069935, SPN. 0348326, STZ. 0516798, SWD. 0345909, VZL. 0025948.
3,504,376.—AUTOMATED CHEMICAL ANALYZER. MAR. 31, 1970. ARG. 0177588, ATR. 0300733, AUS. 0441839, BEL. 0722721, CAN. 0921812, FIN. 0050908, FRA. 1584398, GRB. 1218750, IND. 0113631, ITL. 0856574, LXB. 0057969, MEX. 0112300, NOR. 0131259, NZL. 0155344, PNM. 0001667, SAF. 0690934, SPN. 0362595, STZ. 0526109, SWD. 0365310, VZL. 0027510.
3,508,879.—ALIQUOTTING DEVICE. APR. 28, 1970. ATR. 0280666, AUS. 0429344, BEL. 0722722, CAN. 0883952, FRA. 1578475, GER. 1673343, GRB. 1218747, ITL. 0862567, LXB. 0057971, MEX. 0101480, NOR. 0131257, NZL. 0155346, SAF. 0069936, SPN. 0363624, STZ. 0494403, SWD. 0342699.
3,526,480.—AUTOMATED CHEMICAL ANALYZER. SEPT. 1, 1970. ARG. 0174584, AUS. 0452281, BEL. 0728248, CAN. 0950341, FRA. 1584397, GER. 1673340, GRB. 1218749, HOL. 1467250, ITL. 0865002, MEX. 0118203, PNM. 0001668, SPN. 0381340, STZ. 0501922, SWD. 0359925, VZL. 0025782.
3,582,283.—CHEMICAL PACKAGE. JUNE 1, 1971.

Class 22B 1A

3,477,821.—CHEMICAL PACKAGE. NOV. 11, 1969. ARG. 0169582, AUS. 0433117, BEL. 0725955, CAN. 0876261, FRA. 1596338, GER. 1816225, GRB. 1245780, HOL. 0141402, ITL. 0852626, JAP. 0805178, MEX. 0108467. PNM. 0001764, SPN. 0361841, STZ. 0531895, SWD. 0345742, VZL. 0023719.
3,477,822.—CHEMICAL PACKAGE. NOV. 11, 1969. ARG. 0169541, AUS. 0433116, BEL. 0725958, CAN. 0904725, FRA. 1596340, GRB. 1251680, HOL. 0141098, ITL. 0852625, JAP. 0802751, MEX. 0108998, PNM. 0001662, SPN. 0361844, STZ. 0530223, SWD. 0346384, VZL. 0023725.

3,480,398.—CHEMICAL PACKAGE. NOV. 25, 1969. ARG. 0169487, AUS. 0433114, BEL. 0725956, CAN. 0885006, FRA. 1596337, GER. 1816228, GRB. 1257336, HOL. 0141797, ITL. 0856875, JAP. 0805177, MEX. 0108468, PNM. 0001663, SPN. 0361842, STZ. 0530637, SWD. 0345012, VZL. 0023722.

3,480,399.—CHEMICAL PACKAGE. NOV. 25, 1969. ARG. 0169540, AUS. 0433115, BEL. 0725957, CAN. 0906891, FRA. 1596339, GER. 1816227, GRB. 1251679, HOL. 0141099, ITL. 0852624, JAP. 0802750. MEX. 0108997, PNM. 0001669, SPN. 0361843, STZ. 0526106, VZL. 0023720.

3,497,320.—AUTOMATED CHEMICAL ANALYZER - FLEXIBLE POD SYSTEM. FEB. 24, 1970. ARG. 0182336, ATR. 0308052, AUS. 0419707, BEL. 0722723, CAN. 0917546, FIN. 0050909, FRA. 1578476, GER. 1673342, GRB. 1218748, IND. 0113632, ITL. 0856573, LXB. 0057970, MEX. 0112299, NOR. 0131258, NZL. 0164681, PNM. 0001771, SAF. 0069935, SPN. 0348326, STZ. 0516798, SWD. 0345909, VZL. 0025948.

3,504,376.—AUTOMATED CHEMICAL ANALYZER. MAR. 31, 1970. ARG. 0177588, ATR. 0300733, AUS. 0441839, BEL. 0722721, CAN. 0921812, FIN. 0050908, FRA. 1584398, GRB. 1218750, IND. 0113631, ITL. 0856574, LXB. 0057969, MEX. 0112300, NOR. 0131259, NZL. 0155344, PNM. 0001667, SAF. 0690934, SPN. 0362595, STZ. 0526109, SWD. 0365310, VZL. 0027510.

3,545,934.—CHEMICAL PACKAGE. DEC. 8, 1970. BEL. 0739751, CAN. 0887759. FRA. 6933737, GER. 1950067, GRB. 1257337, HOL. 150690, ITL. 0873750.

3,545,935.—DISPOSABLE REACTION CONTAINER FOR AN AUTOMATIC CHEMICAL ANALYZER. DEC. 8, 1970. ARG. 0179456, AUS. 0447958, BEL. 0741890, CAN. 0933494, FRA. 6939709, GER. 1957735, GRB. 1257338, HOL. 0145773, ITL. 0878322, MEX. 0113681, SPN. 0373794, STZ. 0500010, SWD. 0353399.

3,554,705.—CHEMICAL PACKAGE. JAN. 12, 1971.

3,582,283.—CHEMICAL PACKAGE. JUNE 1, 1971.

3,582,285.—CHEMICAL PACKAGE. JUNE 1, 1971.

Class 22B 1B

3,497,320.—AUTOMATED CHEMICAL ANALYZER - FLEXIBLE POD SYSTEM. FEB. 24, 1970. ARG. 0182336, ATR. 0308052, AUS. 0419707, BEL. 0722723, CAN. 0917546, FIN. 0050909, FRA. 1578476, GER. 1673342, GRB. 1218748, IND. 0113632, ITL. 0856573, LXB. 0057970, MEX. 0112299, NOR. 0131258, NZL. 0164681, PNM. 0001771, SAF. 0069935, SPN. 0348326, STZ. 0516798, SWD. 0345909, VZL. 0025948.

3,508,879.—ALIQUOTTING DEVICE. APR. 28, 1970. ATR. 0280666, AUS. 0429344, BEL. 0722722, CAN. 0883952, FRA. 1578475, GER. 1673343, GRB. 1218747, ITL. 0862567, LXB. 0057971, MEX. 0101480, NOR. 0131257, NZL. 0155346, SAF. 0069936, SPN. 0363624, STZ. 0494403, SWD. 0342699.

3,526,480.—AUTOMATED CHEMICAL ANALYZER. SEPT. 1, 1970. ARG. 0174584, AUS. 0452281, BEL. 0728248, CAN. 0950341, FRA. 1584397, GER. 1673340, GRB. 1218749, HOL. 1467250, ITL. 0865002, MEX. 0118203, PNM. 0001668, SPN. 0381340, STZ. 0501922, SWD. 0359925, VZL. 0025782.

3,586,446.—FLAME PHOTOMETER. JUNE 22, 1971. ARG. 0183956, BEL. 0720577, CAN. 0876239, FRA. 1581844, GER. 1798234, GRB. 1246633, ITL. 0864506, JAP. 0835088, MEX. 0103300, SWD. 0342326, VZL. 0023659.

Class 22B 2

3,497,320.—AUTOMATED CHEMICAL ANALYZER - FLEXIBLE POD SYSTEM. FEB. 24, 1970. ARG. 0182336. ATR. 0308052, AUS. 0419707, BEL. 0722723, CAN. 0917546, FIN. 0050909, FRA. 1578476, GER. 1673342, GRB. 1218748, IND. 0113632, ITL. 0856573, LXB. 0057970, MEX. 0112299, NOR. 0131258, NZL. 0164681, PNM. 0001771, SAF. 0069935, SPN. 0348326, STZ. 0516798, SWD. 0345909, VZL. 0025948.

3,504,376.—AUTOMATED CHEMICAL ANALYZER. MAR. 31, 1970. ARG. 0177588, ATR. 0300733, AUS. 0441839, BEL. 0722721, CAN. 0921812, FIN. 0050908, FRA. 1584398, GRB. 1218750, IND. 0113631, ITL. 0856574, LXB. 0057969, MEX. 0112300, NOR. 0131259, NZL. 0155344, PNM. 0001667, SAF. 0690934, SPN. 0362595, STZ. 0526109, SWD. 0365310, VZL. 0027510.

3,520,659.—METHOD AND APPARATUS FOR USE IN DETERMINING PROTHROMBIN TIME OF A BLOOD SAMPLE. JULY 14, 1970. ARG. 0176972, AUS. 0421560, BEL. 0722360, CAN. 0892696, FRA. 1588701, GER. 1804292, GRB. 1244355, HOL. 0142783, ITL. 0862597, MEX. 0105611, SPN. 0359312, SWD. 0345744, VZL. 0023706.

3,705,013.—ANALYTICAL PROCEDURES AND COMPOSITIONS THEREFOR. DEC. 5, 1972.

Class 24

3,888,892.—LIQUID CRYSTALLINE COMPOUNDS. JUNE 10, 1975.

Class 24A 1

3,289,211.—ELECTRICAL RECORDING PEN. NOV. 29, 1966. ARG. 0144972, AUS. 0283737, BEL. 0663614, CAN. 0755964. FRA. 1444045, GER. 1498264, GRB. 1064344, HOL. 0145955, ITL. 0760432, JAP. 0704598, MEX. 0084384, NOR. 0121120, NZL. 0141445, SPN. 0312594, STZ. 0430241, SWD. 0336857, VZL. 0017268.

3,308,475.—ELECTROVISCOUSLY CONTROLLED RECORDER. MAR. 7, 1967.

3,359,566.—MOTOR ACTION CAPILLARY. DEC. 19, 1967. CAN. 0831673, GER. 1537562, GRB. 1196932, JAP. 0583415.

3,375,528.—RECORDING PEN HAVING A PLURALITY OF CLOSELY SPACED WIRES. MAR. 26, 1968. AUS. 0284067, BEL. 0680693, CAN. 0834975, FRA. 0089948, GER. 1548876, GRB. 1148771, HOL. 0150907, ITL. 0809504, JAP. 0773176, MEX. 0091261, SPN. 0326324, STZ. 0457888, SWD. 0325719.

3,484,162.—ELECTROVISCOUS RECORDING. DEC. 16, 1969.

3,512,173.—ALPHANUMERIC INK DROPLET RECORDER. MAY 12, 1970. ARG. 0180676, BEL. 0725960, CAN. 0879917, FRA. 1603645, GER. 1816194, GRB. 1227600, ITL. 0849703, JAP. 0770832, MEX. 0109982.

3,512,177.—INK RECORDING SYSTEM. MAY 12, 1970.

3,848,258.—MULTI-JET INK PRINTER. NOV. 12, 1974. BEL. 0819105, CAN. 1000778, FRA. 7419592.

3,893,131.—INK PRINTER. JULY 1, 1975. BEL. 0819105, CAN. 1000778, FRA. 7419592.

4,014,693.—ELECTROVISCOUS RECORDING. MAR. 29, 1977.

Class 24A 2

3,329,964.—FACSIMILE RECORDING APPARATUS. JULY 4, 1967. CAN. 0809338, GRB. 1095098.

3,334,354.—DOTTING INK RECORDER. AUG. 1, 1967. CAN. 0792422.

3,627,908.—HIGH-SPEED COLOR CORRECTING SCANNER FOR MAKING COLOR PRINTING PLATES. DEC. 14, 1971. CAN. 0923428, GRB. 1335980, JAP. 0774708.

4,024,544.—MENISCUS DAMPENING DROP GENERATOR. MAY 17, 1977.

4,032,929.—HIGH DENSITY LINEAR ARRAY INK JET ASSSEMBLY. JUNE 28, 1977.

Class 24A 3

3,287,734.—MAGNETIC INK RECORDING. NOV. 22, 1966. CAN. 0808834, FRA. 1490442, GRB. 1102505, HOL. 0150643, ITL. 0784569, JAP. 0571140.

3,334,000.—METHOD FOR SIMULTANEOUS PRODUCTION OF A PLURALITY OF MICROCIRCUIT WAFERS. AUG. 1, 1967.

Class 24A 4

3,480,962.—FACSIMILE RECORDING SYS. NOV. 25, 1969.

3,484,162.—ELECTROVISCOUS RECORDING. DEC. 16, 1969.

3,484,793.—IMAGE RECORDING APPARATUS INK DROPLET RECORDER WITH OPTICAL INPUT. DEC. 16, 1969.

3,553,708.—APPARATUS AND METHOD EMPLOYING PHOTOELECTROVISCOUS INK. JAN. 5, 1971.

Class 24B

3,951,658.—COLOR MODIFYING IMAGING METHOD AND ARTICLE. APR. 20, 1976.

Class 24B 1

3,833,293.—METHOD OF CREATING COLOR TRANSPARENCIES. SEPT. 3, 1974.

Class 24B 1A

2,738,705.—FILE-HOLDING DEVICE FOR CAMERA COPY SUPPORT. MAR. 20, 1956.

2,758,503.—COPY-HOLDING APPARATUS. AUG. 14, 1956.

Class 24B 1B 1

3,528,355.—CAMERA-PROCESSOR. SEPT. 15, 1970. ARG. 0184627, ATR. 0303513, AUS. 0426557, BEL. 0720022, BRA. 6800654, CAN. 0864811, CHL. 0024251, CLB. 0018453, FRA. 1586179, GER. 1797177, GRB. 1244641, IND. 0117458. ITL. 0839895, LXB. 0056774, MEX. 0103737, NOR. 0128296, NZL. 0153587, PLP. 0006313, PNM. 0001980, PRU. 0010212, PTG. 0050229, SPN. 0357651, STZ. 0516171, SWD. 0338503, URG. 0009309, VZL. 0023698.

Class 24B 1B 2

2,940,358.—IMAGE REVERSING OPTICAL SYSTEM. JUNE 14, 1960.

Class 24B 1B 3

3,459,888.—SELECTIVE PHOTOCOPIER. AUG. 5, 1969.
3,537,788.—AUTOMATIC DISCRIMINATION TECHNIQUE FOR SELECTIVE PHOTOCOPYING. NOV. 3, 1970.

Class 24B 1C

2,978,968.—RECORDING APPARATUS AND METHOD. APR. 11, 1961.
3,393,362.—PROCESS FOR DETECTING IRREGULARITIES IN A METALLIC SURFACE. JULY 16, 1968.
3,480,965.—APPARATUS FOR PYROGENICALLY RECORDING ON TRANSPARENCIES. NOV. 25, 1969.

Class 24B 1D

2,752,443.—SIGNALING DEVICE FOR PHOTOCOPY MACHINE. JUNE 26, 1956.
3,435,243.—FILM FRAME DETECTION SYSTEM. MAR. 25, 1969.

Class 24B 2A

3,349,980.—VACUUM TRANSPORT DEVICE. OCT. 31, 1967.
3,388,875.—WEB TRANSPORT CONTROL ASSEMBLY. JUNE 18, 1968.

Class 24B 2B

3,409,364.—GATE ASSEMBLY. NOV. 5, 1968.
3,409,365.—CONTACT PRINTER. NOV. 5, 1968. AUS. 0425973, JAP. 0613746.

Class 24B 2C

3,379,110.—EXPOSURE CONTROL SYSTEM. APR. 23, 1968.
3,479,119.—EXPOSURE CONTROL APPARATUS. NOV. 18, 1969.

Class 24B 2D 1

2,740,716.—PHOTOGRAPHIC STRIPPING TISSUE. APR. 3, 1956.

Class 24B 3A

2,827,428.—PHOTOGRAPHIC EMULSION PURIFICATION-IONICS. MAR. 18, 1958.

Class 24B 3B

2,913,973.—PHOTOGRAPHIC MATERIAL CONVEYING APPARATUS. NOV. 24, 1959.
2,913,974.—PHOTOGRAPHIC MATERIAL PROCESSING. NOV. 24, 1959.

Class 24B 4

3,510,216.—PROJECTION APPARATUS. MAY 5, 1970.

Class 24C

4,007,682.—REVERSE ANGLE MOUNTED INK-SPLITTING DOCTOR BLADE. FEB. 15, 1977.

Class 24C 1

3,843,407.—BLADE CLEANING WITH REVERSE MOVEMENT. OCT. 22, 1974.

Class 24C 1A

3,170,395.—DUPLICATING. FEB. 23, 1965. AUS. 0410880, CAN. 0768079, FRA. 1414985, GRB. 1059659, ITL. 0740682, JAP. 0511405.
3,332,347.—DUPLICATING. JULY 25, 1967. AUS. 0271226, CAN. 0761868, FRA. 1367474, GER. 1471696, GRB. 1029997, ITL. 0730203.
3,357,353.—VAPOR THERMOGRAPHY RECORDING PROCESS AND RECORDING MEMBER USED THEREIN. DEC. 12, 1967.

Class 24C 1B

3,336,867.—DUPLICATING PROCESS. AUG. 22, 1967. CAN. 0796971, GRB. 1149056.

Class 24C 1C

3,487,775.—IMAGING SYSTEM. JAN. 6, 1970. CAN. 0873983.

Class 24C 1D

3,408,216.—IMAGE REPRODUCTION. OCT. 29, 1968. CAN. 0806942, GRB. 1127218, JAP. 0742511.
3,792,266.—THERMOGRAPHIC RECORDING USING VAPORIZED MATERIAL AND COLORED PARTICLE DEVELOPMENT. FEB. 12, 1974.

Class 24C 1E 1

3,402,660.—DRUM SUPPORT AND DRIVE SYSTEM FOR REPRODUCTION MACHINES. SEPT. 24, 1968.
3,427,965.—SHEET GRIPPER MEANS FOR REPRODUCTION MACHINE OF THE PRESSURE TRANSFER TYPE. FEB. 18, 1969.
3,429,259.—PRESSURE TRANSFER REPRODUCTION MACHINE. FEB. 25, 1969.
3,460,472.—TRANSFER SHEET CLAMPING MECHANISM FOR A REPRODUCTION MACHINE. AUG. 12, 1969.

Class 24C 1E 2

3,433,154.—PRESSURE PRODUCING MEANS FOR REPRODUCTION MACHINE. MAR. 18, 1969.

Class 24C 1E 3

3,374,732.—SELF-ALIGNING COPY DRUM STRIPOUT MECHANISM FOR REPRODUCTION MACH. MAR. 26, 1968.
3,375,780.—SHEET COUNTING MECHANISM FOR REPRODUCTION MACHINES. APR. 2, 1968.
3,380,379.—SHEET GUIDING MECHANISM FOR A REPRODUCTION MACHINE. APR. 30, 1968.
3,405,635.—PAPER SUPPORT TRAY FOR REPRODUCTION MACHINES. OCT. 15, 1968.
3,427,966.—PRESSURE TRANSFER TYPE REPRODUCTION MACHINE. FEB. 18, 1969.
3,430,558.—SHEET COUNTING SYSTEM IN A REPRODUCTION MACHINE. MAR. 4, 1969.

Class 24C 1E 4

3,375,779.—PROGRAMMING CONTROL FOR REPRODUCTION MACHINES. APR. 2, 1968.

Class 24C 1E 5

2,949,849.—STENCIL MASTER MAKING. AUG. 23, 1960.
3,083,684.—APPARATUS FOR PATTERN REPRODUCTION. APR. 2, 1963.
3,093,068.—METHOD AND APPARATUS FOR PATTERN REPRODUCTION. JUNE 11, 1963. CAN. 0624373.
3,548,748.—DUPLICATING METHOD EMPLOYING SIMULTANEOUS APPLICATION OF ELECTRIC FIELD AND EXPOSURE TO RADIATION. DEC. 22, 1970. CAN. 0882051, GRB. 1227394, JAP. 0752522.
3,565,612.—DUPLICATING MASTERS BY THE MANIFOLD PROCESS. FEB. 23, 1971. ARG. 0193797, AUS. 0411612, BEL. 0708974, CAN. 0873277, FRA. 1549964, GER. 1671590, GRB. 1215956, ITL. 0823464, MEX. 0106608, VZL. 0023681.
3,681,065.—DYE TRANSFER COLOR PHOTOGRAPHY. AUG. 1, 1972.

Class 24C 1E 6

3,527,163.—SILK SCREEN MASTER. SEPT. 8, 1970.

Class 24C 1E 7

3,357,354.—REPRODUCTION METHOD. DEC. 12, 1967.
3,406,137.—IMAGING MATERIAL. OCT. 15, 1968. AUS. 0409415, BEL. 0680375, CAN. 0815085, FRA. 1477912, GER. 1571874, GRB. 1149055, ITL. 0766799, JAP. 0594685, MEX. 0090845, SWD. 0336860.
3,415,186.—DUPLICATING SYSTEM. DEC. 10, 1968.
3,436,234.—DUPLICATING INK. APR. 1, 1969. AUS. 0408998, BEL. 0680377, CAN. 0806568, FRA. 1477914, GER. 1571875, GRB. 1151495, ITL. 0765635, JAP. 0594687, MEX. 0090362, SWD. 0336421.
3,446,646.—PRESSURE SENSITIVE RECEIVING AND TRANSFER SHEET. MAY 27, 1969. AUS. 0417562, BEL. 0680376, CAN. 0865673, FRA. 1477913, GER. 1571922, GRB. 0115076, ITL. 0765634, JAP. 0575982, MEX. 0090589, SWD. 0333578.

Class 24D

2,952,536.—METHOD OF PREPARING A LITHOGRAPHIC PRINGING PLATE. SEPT. 13, 1960.
2,988,988.—METHOD OF ETCHING AND DAMPENING PLANOGRAPHIC PRINTING PLATES AND FOUNTAIN SOLUTION THEREFOR. JUNE 20, 1961.
3,001,872.—PREPARING PLANOGRAPHIC PLATES AND SOLUTION THEREFOR. SEPT. 26, 1961. CAN. 0610997, GRB. 0879990.
3,275,436.—METHOD OF IMAGE REPRODUCTION UTILIZING A UNIFORM RELEASABLE SURFACE FILM. SEPT. 27, 1966. AUS. 0296158, CAN. 0811877, FRA. 1371894, GRB. 1033523, ITL. 0702168, JAP. 0508402.
3,422,759.—LITHOGRAPHIC IMAGING SYSTEM USING PHOTOCHROMIC AND THERMOCHROMIC MATERIALS. JAN. 21, 1969. CAN. 0855648, GRB. 1190102.
3,460,476.—IMAGING PROCESS. AUG. 12, 1969. ARG. 0164839, AUS. 0418783, BEL. 0691755, CAN. 0882050, FRA. 1511173, GRB. 1168268, ITL. 0787662, JAP. 0562388, MEX. 0108240, SPN. 0346128, STZ. 0480672, SWD. 0331794. VZL. 0024009.
3,547,627.—LITHOGRPHC PRINTG MASTER AND METHOD EMPLOYING A CRYSTALLINE PHOTOCONDUCTIVE IMAGING LAYER. DEC. 15, 1970.
3,554,125.—METHOD OF MAKING A LITHOGRAPHIC MASTER AND METHOD OF PRINTING THEREWITH. JAN. 12, 1971. CAN. 0882052, GER. 1772302, GRB. 1219849.
3,718,087.—APPARATUS FOR APPLYING INK AND IMMISSIBLE FLUID TO A PRINTING SURFACE. FEB. 27, 1973. ARG. 0185945, AUS. 0449639, BEL. 0759110, CAN. 0919007, FRA. 7042608, GRB. 1330183, ITL. 0912865, MEX. 0120782.
3,878,168.—SILICONE ELASTOMERS. APR. 15, 1975.
3,901,151.—PROCESS FOR PREPARING WATERLESS LITHOGRAPHIC MASTERS. AUG. 26, 1975.
3,907,562.—PROCESS FOR PREPARING WATERLESS LITHOGRAPHIC MASTERS. SEPT. 23, 1975.
3,909,256.—ELECTROSTATOGRAPHIC PROCESS FOR PREPARING SCREEN PRINTING MEMBER. SEPT. 30, 1975.
3,923,504.—MIGRATION IMAGING MEMBER AND METHOD. DEC. 2, 1975. GRB. 1461872.
3,948,655.—ELECTROSTATOGRAPHIC PROCESS FOR PREPARING GRAVURE PRINTING MEMBER. APR. 5, 1976.
3,951,060.—PROCESS FOR PREPARING WATERLESS LITHOGRAPHIC MASTERS. APR. 20, 1976.
3,951,063.—PROCESS FOR PREPARING REVERSIBLE CURE WATERLESS LITHOGRAPHIC MASTERS. APR. 20, 1976.
3,957,349.—IMAGING METHOD. MAY 18, 1976.
3,961,947.—PROCESS FOR PREPARING WATERLESS LITHOGRAPHIC MASTERS. JUNE 8, 1976.
3,968,278.—IMAGING METHOD. JULY 6, 1976.
3,971,316.—PROCESS FOR SMOOTHING WATERLESS LITHOGRAPHIC MASTERS. JULY 27, 1976.
3,995,554.—PROCESS FOR PREPARING RESILIENT IMAGED PRINTINGS MASTERS. DEC. 7, 1976.
3,999,481.—METHOD OF MAKING A MASTER. DEC. 28, 1976.
4,003,312.—PROCESS FOR PREPARING WATERLESS LITHOGRAPHIC PRINTING MASTERS BY INK JET PRINTING MEANS. JAN. 18, 1977.
4,005,654.—PROCESS FOR SHALLOW RELIEF PRINTING. FEB. 1, 1977. BEL. 0792620, FRA. 7244602, GRB. 1416158, ITL. 0971749.
4,007,041.—ELECTROPHOTOGRAPHIC PRINTING METHOD. FEB. 8, 1977.
4,009,032.—PROCESS FOR PREPARING WATERLESS PRINTING MASTERS COMPRISING COPOLYMER OF SILOXANE AND THERMOPLA. FEB. 22, 1977.
4,009,660.—INKING IN LITHO PRINTING THROUGH A NON-IMAGED SCREEN. MAR. 1, 1977.
4,010,687.—PLANOGRAPHIC PRINTING MASTER-MULTI PHASE TONERS & MULTI PHASE ADHESIVE LAYERS. MAR. 8, 1977. BEL. 0813293, CAN. 0988364, GRB. 1458725, ITL. 1006438, PTG. 61726.
4,012,254.—NOVEL PHOTOCONDUCTIVE WATERLESS LITHOGRAPHIC PRINTING MASTERS & PROCESS OF PREPARATION. MAR. 15, 1977.
4,016,814.—PLANOGRAPHIC PRINTING MASTER — SPONGY IMAGE PATTERNS. APR. 12, 1977. CAN. 0985952, ITL. 1006441.
4,019,437.—PLANOGRAPHIC PRINTING MASTER TONER INDUCED POROUS SPONGE IMAGES TIPSI. APR. 26, 1977. BEL. 0813159, CAN. 1014416, GRB. 1458723, ITL. 1006440, NZL. 0173942.
4,030,416.—WATERLESS PRINTING MASTER. JUNE 21, 1977.

Class 24E

3,315,602.—FORMING OF PRINTING PLATES. APR. 25, 1967. CAN. 0852683, GER. 1267227, GRB. 1132071, JAP. 0532965.
3,443,517.—ELECTROSTATIC DUPLICATION SYSTEM EMPLOYING RELIEF PRINTING PLATE. MAY 13, 1969. CAN. 0873982, GRB. 1212370, JAP. 0641477.
3,456,586.—PROCESS FOR MAKING AND USING A RELIEF PRINTING MASTER. JULY 22, 1969.
3,589,290.—RELIEF IMAGING PLATES MADE BY REPETITIVE XEROGRAPHIC PROCESSES. JUNE 29, 1971. CAN. 0896949.
3,957,348.—METHOD FOR ALTERING ELLIPTICALLY POLARIZED LIGHT. MAY 18, 1976.
3,964,907.—METHOD FOR THE PREPARATION OF RELIEF PRINTING MASTERS. JUNE 22, 1976.
4,017,581.—PROCESS FOR PREPARING PRINTING MASTERS & MOLDS. APR. 12, 1977.

Class 24F

3,445,226.—FROST GRAVURE PRINT MASTER. MAY 20, 1969. CAN. 0842443, FRA. 1480896, GRB. 1136029, ITL. 0771305, JAP. 0605647, MEX. 0093298.
3,559,570.—METHOD OF PREPARING AND USING A GRAVURE PRINTING PLATE. FEB. 2, 1971. CAN. 0844544, GRB. 1198142.
3,561,358.—GRAVURE IMAGING SYSTEM. FEB. 9, 1971. CAN. 0908257, GRB. 1201819, JAP. 0594737.
3,638,567.—METHOD OF PREPARING AND UTILIZING A GRAVURE PRINTING MASTER. FEB. 1, 1972.
3,801,315.—GRAVURE IMAGING SYSTEM. APR. 2, 1974. CAN. 0991245, GRB. 1411237.
3,918,400.—BLADE MOUNTING ASSEMBLIES. NOV. 11, 1975. BEL. 0816534, FRA. 7421752, GRB. 1419417.
3,980,404.—XEROGRAPHIC APPARATUS HAVING IMPROVED FLUID DISPENSING MEMBER. SEPT. 14, 1976.
4,024,838.—DEVELOPER LIQUID SUPPLY DEVICE. MAY 24, 1977.

Class 24G

3,565,978.—REPLICATION OF SURFACE DEFORMATION IMAGES. FEB. 23, 1971. AUS. 0417038, BEL. 0710829, CAN. 0879916, FRA. 1583418, GER. 1621783, GRB. 1221342, ITL. 0863054, MEX. 0096672.
3,592,114.—APPARATUS FOR JUSTIFYING A REPRODUCED LINE OF CHARACTERS. JULY 13, 1971.
3,678,850.—POROUS PRINTING PLATE PREPARED FROM PARTICULATE PHOTOSENSITIVE RESINOUS MATERIAL. JULY 25, 1972. CAN. 0844327, GRB. 1188376, JAP. 0635879.

Class 25

3,692,659.—ELECTROLYTIC REVERSIBLE COLOR DISPLAY DEVICE. SEPT. 19, 1972. CAN. 0932427, GRB. 1356187.

Class 25A

3,692,404.—STRIPPABLE LAYER RELIEF PRINTING. SEPT. 19, 1972.
3,900,817.—SPHERICAL POTENTIOMETER WITH BALL CONTACT MEANS. AUG. 19, 1975.
3,990,072.—ACOUSTIC RESIDUE ALGEBRA DECORDER. NOV. 2, 1976.

Class 25A 1

3,061,911.—METHOD OF MAKING PRINTED CIRCUITS. NOV. 6, 1962.
3,075,866.—METHOD OF MAKING PRINTED CIRCUITS. JAN. 29, 1963.
3,207,127.—APPARATUS FOR FORMING COATINGS ON PRINTED CIRCUIT BOARDS. SEPT. 21, 1965. CAN. 0733463, FRA. 1374360, GER. 1490985, GRB. 1053284, ITL. 0696974.
3,217,209.—PRINTED CIRCUITS WITH RESISTIVE AND CAPACITIVE ELEMENTS. NOV. 9, 1965. CAN. 0782178, FRA. 1300771, GER. 1202853, GRB. 0978571, ITL. 0647493, JAP. 0430795.
3,219,509.—AN APPARATUS FOR AUTOMATIC FABRICATION OF MICROCIRCUITRY. NOV. 23, 1965. CAN. 0785448, GRB. 1031288, JAP. 0477810.
3,288,639.—METHOD FOR MAKING A PLURAL LAYERED PRINTED CIRCUIT BOARD. NOV. 29, 1966.
3,485,934.—CIRCUIT BOARD. DEC. 23, 1969.
3,893,409.—APPARATUS FOR SOLDER COATING PRINTED CIRCUIT. JULY 8, 1975.
3,990,024.—MICROSTRIP STRIPLINE IMPEDANCE TRANSFORMER. NOV. 2, 1976.
4,018,414.—HOLDING FIXTURES. APR. 19, 1977.
4,024,631.—PRINTED CIRCUIT BOARD PLATING PROCESS. MAY 24, 1977.
4,029,373.—MEANS FOR WIRING INTO A SEALED ENCLOSURE. JUNE 14, 1977. CAN. 0995367, GRB. 1444032.
3,134,930.—MICROMINIATURE CIRCUITRY. MAY 26, 1964.

Class 25A 2

3,134,930.—MICROMINIATURE CIRCUITRY. MAY 26, 1964.
3,164,750.—ELECTRONIC PACKAGING APPARATUS. JAN. 5, 1965.
3,445,926.—PRODUCTION OF SEMICONDUCTOR DEVICES BY USE OF ION BEAM IMPLANTATION. MAY 27, 1969.
3,906,537.—SOLID STE ELMNT CMPRSNG SMI-CNDCTVE GLS CMPSTN EXHBING NGTVE INCRMNTL RSISTNCE AND TRSHLD SWTCHNG. SEPT. 16, 1975. BEL. 0820772, CAN. 1005929.
3,956,042.—SELECTIVE ETCHANTS FOR THIN FILM DEVICES. MAY 11, 1976.

Class 25A 3

3,244,556.—ABRASION FOR THIN FILM RESISTANCE CONTROL. APR. 5, 1966. CAN. 0788954, FRA. 1385420, GER. 1490986, GRB. 1054076, ITL. 0705899, JAP. 0453904.
3,274,372.—SOLID VAPORIZATION. SEPT. 20, 1966.
3,287,161.—METHOD FOR FORMING A THIN FILM RESISTOR. NOV. 22, 1966. CAN. 0819895, ITL. 0705900, JAP. 0499787.
3,352,731.—THIN FILM PRINTED CIRCUIT. NOV. 14, 1967. AUS. 0296168, CAN. 0790796, FRA. 1419084, GER. 1490987, GRB. 1077686, ITL. 0739442, JAP. 0537661.
3,413,716.—THIN FILM INDUCTOR ELEMENTS. DEC. 3, 1968. CAN. 0841245, FRA. 1476476, GRB. 1149759.
3,832,766.—APPARATUS FOR ASSEMBLING A PLATED WIRE MEMORY PLANE. SEPT. 3, 1974. CAN. 0942420, GRB. 1376654.

Class 25A 4

3,317,656.—ELECTRICAL CONNECTION FOR SHEATHED CONDUCTORS. MAY 2, 1967.
3,603,357.—BACKWIRING. SEPT. 7, 1971.
3,644,659.—CABLE CONSTRUCTION. FEB. 22, 1972.
3,792,227.—FUSER APPARATUS. FEB. 12, 1974.
3,847,479.—COVER FOR WIRE WRAPPED CARD CHASSIS. NOV. 12, 1974.
3,861,775.—MULTIPLE CIRCUIT BOARD CONNECTOR. JAN. 21, 1975. GRB. 1419580.
3,869,696.—FUSER APPARATUS. MAR. 4, 1975.
3,903,937.—BACK WIRING. SEPT. 9, 1975.

Class 25B

3,688,127.—DIGITAL CIRCUIT LOGIC. AUG. 29, 1972.
3,937,986.—LINEAR WAVEFORM GENERATOR. FEB. 10, 1976.
3,975,755.—STABLE NON-CRYSTALLINE MATERIAL FOR SWITCHING DEVICES. AUG. 17, 1976.

Class 25B 1

3,384,792.—STACKED ELECTRODE FIELD EFFECT TRIODE. MAY 21, 1968.
3,584,268.—INVERTED SPACE CHARGE LIMITED TRIODE. JUNE 8, 1971.
3,599,321.—INVERTED SPACE CHARGE LIMITED TRIODE. AUG. 17, 1971.

Class 25B 2

3,510,735.—HIGH SPEED SEMICONDUCTOR. MAY 5, 1970.
3,673,572.—ELECTROLUMINESCENT DEVICE. JUNE 27, 1972. CAN. 0919286.
3,697,163.—PLUG-IN VACUUM AND CIRCUIT SYSTEM FOR ELECTROSTATIC PRINTING MACHINES. OCT. 10, 1972. CAN. 0941883.

Class 25B 3

3,551,727.—THERMIONIC CONVERTER HAVING A LOW FUNCTION COLLECTOR ELECTRODE. DEC. 29, 1970.
3,928,812.—PROGRAMMABLE BIT CLOCK OSCILLATOR FOR CONTROLLING THE PROCESSING OF BINARY DIGITS. DEC. 23, 1975. CAN. 0997434.

Class 25B 4

3,579,031.—ZERO ARC DROP THYRATRON. MAY 18, 1971.

Class 25C

3,911,420.—DISPLAY SYSTEM INCLUDING A HIGH-RESOLUTION CHARACTER GENERATOR. OCT. 7, 1975.
3,937,937.—PRIMARY POWER FAULT DETECTOR. FEB. 10, 1976. CAN. 1011818.

Class 25C 1

3,296,483.—WIDEBND AMPLER UTLZNG COMN ELCTRN BEAM FR INTRACTN W/HIFRQCY TRVLGWAVE LINE AND W/LOWFRQCY ELCTRN M. JAN. 3, 1967.
3,299,367.—FEEDBACK AMPLIFIER. JAN. 17, 1967.
3,404,341.—ELECTROMETER UTILIZING A DUAL PURPOSE FIELD-EFFECT TRANSISTOR. OCT. 1, 1968.
3,457,520.—FIELD EFFECT TRANSISTOR BUFFER AMPLIFIER. JULY 22, 1969. CAN. 0830628, FRA. 1541017, GER. 1562109, GRB. 1189515, ITL. 0806188, JAP. 0573712.
3,525,948.—SEISMIC AMPLIFIERS. AUG. 25, 1970.
3,594,654.—DIRECT COUPLED DIFFERENTIAL AMPLIFIER. JULY 20, 1971.
3,790,288.—PHOTOMETER INCLUDING VARIABLE AMPLIFICATION AND DARK CURRENT COMPENSATION. FEB. 5, 1974.

Class 25C 2

2,475,722.—WEB FEED CONTROL. JULY 12, 1949.
3,316,495.—LOW LEVEL COMMUTATOR. APR. 25, 1967.
3,426,259.—ELECTRIC CONTROL CIRCUITS FOR SEQUENTIAL OPERATION OF MOTIVE MEANS. FEB. 4, 1969.
3,454,884.—DUTY CYCLE CONTROL CIRCUIT. JULY 8, 1969. CAN. 0859886, GRB. 1195983, JAP. 0576017.
3,612,907.—SELF-CHECKING FLIP-FLOP. OCT. 12, 1971.
3,668,414.—TRANSITION INTEGRATION SWITCHING AMPLIFIER. JUNE 6, 1972. ARG. 0183473, AUS. 0460647, BEL. 0765005, CAN. 0930432, FRA. 7111626, GRB. 1334407, ITL. 0921529, MEX. 0119755, USR. 0420197, VZL. 0027511.
3,795,857.—ELECTRICAL CONNECTOR TESTING APPARATUS HAVING A PLURALITY OF AND GATES. MAR. 5, 1974.
3,806,242.—APPARATUS FOR REGULATING OPERATION OF DEV IN ACCORDANCE W SUPPLY OF MATERIAL UPON WHICH DEV OPER. APR. 23, 1974. CAN. 1004288, GRB. 1387190.
3,828,222.—FLASH LAMP CIRCUIT. AUG. 6, 1974.
3,856,997.—INDICATING AND SWITCHING APPARATUS. DEC. 24, 1974. BEL. 0809124, CAN. 1004261, ITL. 1002375, MEX. 0135820, SPN. 0421710.
3,866,051.—DIGITAL INTERFACE MODULE. FEB. 11, 1975. BEL. 0810490, GBR. 1455213.
3,932,770.—CONTROL CIRCUIT FOR SWITCHING TRIACS. JAN. 13, 1976.

Class 25C 3

3,311,810.—STATIC FREQUENCY MULTIPLIER UTILIZING A PLURALITY OF SATURABLE MAGNETIC CORES. MAR. 28, 1967.
3,340,416.—RADIATION GENERATOR HVNG A CONDCTV COATNG ON A PIEZO-ELCTRC DIFFRCTN GRATING FOR VARYNG OTPT FR. SEPT. 5, 1967.
3,373,377.—SELF-ADJUSTING VARIABLE FREQUENCY SAWTOOTH GENERATOR. MAR. 12, 1968.
3,543,080.—CRT PINCUSHION DISTORTION CORRECTION APPARATUS. NOV. 24, 1970.
3,659,207.—MULTI-WAVE FORM GENERATION FROM A SINGLE TAPPED DELAY LINE. APR. 25, 1972.

Class 25C 4

RE.27,720.—SIGNAL STORAGE DEVICE - RE OF 3416,861-D1593. AUG. 7, 1973.
3,280,309.—LOGARITHMIC PULSE COUNTER. OCT. 18, 1966.
3,416,861.—SIGNAL STORAGE DEVICE—REISSUED D72104-27,720. DEC. 17, 1968. CAN. 0824770, GER. 1524998, GRB. 1184579, JAP. 0571176.
3,422,287.—PULSE STRETCHING CIRCUIT FOR GENERATING PULSES OF MINIMUM WIDTH. JAN. 14, 1969. AUS. 0408950, CAN. 0814593, GRB. 1087749, ITL. 0773401, SWD. 0337041.
3,593,043.—PULSE SHAPING CIRCUIT. JULY 13, 1971.
3,600,610.—TIME DELAY CIRCUIT FOR A RADIANT ENERGY PROTECTIVE APPARATUS. AUG. 17, 1971.
3,757,032.—METHOD AND APPARATUS FOR SELECTIVELY ENABLING A REMOTE RECEIVER. SEPT. 4, 1973.
3,781,548.—CONTROL SYSTEM. DEC. 25, 1973.
3,816,727.—ECHO CHECK CIRCUIT. JUNE 11, 1974. CAN. 0999463, FRA. 7341866, GRB. 1422835.
3,839,665.—APP MEASRNG RELTV VELCTY MOVBL MEMBR INCLDNG MEANS TO DETECT VELCTY FROM POSITION ENCODER. OCT. 1, 1974. CAN. 0980409, GRB. 1290090, JAP. 0832378.
3,863,143.—APP FOR RECORDING THE OCCURRENCE OF A PREDETERMINED OPERATION BY SENSING MAGNETIC FIELD OPERATION. JAN. 28, 1975.
3,875,387.—MAGNETIC OPERATIONS MONITOR. APR. 1, 1975.
3,931,580.—DIGITAL LINE RECEIVER CIRCUIT. JAN. 6, 1976.
3,953,708.—THERMAL PRINTER USING AMORPHOUS SEMICONDUCTOR DEVICES. APR. 27, 1976.
3,971,919.—PROGRAMMABLE BILLING SYSTEM. JULY 27, 1976. BEL. 0812673, FRA. 7409746, GRB. 1451993, ITL. 1007663, SPN. 0424543.
3,983,315.—ELECTROMAGENTIC COUNTER CIRCUIT. SEPT. 28, 1976.
3,987,311.—SHIFT REGISTER UTILIZING AMORPHOUS SEMICONDUCTOR THRESHOLD SWITCHE. OCT. 19, 1976.
3,989,930.—MULTI-MODE BILLING SYSTEM CONTROLLED BY COPY SIZE AND DOCUMENT ORIGINAL SIZE. NOV. 2, 1976.

Class 25C 5

3,275,837.—XEROGRAPHIC CHARGING APPARATUS. SEPT. 27, 1966. ARG. 0158430, ATR. 0242511, AUS. 0276177, BEL. 0642095, CAN. 0753356, FRA. 1385736, GER. 1488286, GRB. 1040264, ITL. 0712888, JAP. 0477814, MEX. 0075819, STZ. 0460930, SWD. 0314133.
3,496,385.—HIGH VOLTAGE COMPENSATED TRANSISTORIZED SWITCHING APPARATUS. FEB. 17, 1970. CAN. 0853862, FRA. 1521443, GRB. 1181718, ITL. 0793728, JAP. 0592682.
3,522,509.—FLOATING POWER SUPPLY. AUG. 4, 1970.
3,809,916.—DUAL CORD INTERLOCK. MAY 7, 1974. CAN. 1004283, GRB. 1423758.
3,870,903.—PHASE CONTROLLED POWER SUPPLY. MAR. 11, 1975.
3,922,595.—HIGH POWER REGULATED D C SUPPLY. NOV. 25, 1975.
3,961,236.—CONSTANT POWER REGULATOR FOR XEROGRAPHIC FUSING SYSTEM. JUNE 1, 1976.
4,004,209.—WIDE RANGE POWER CONVERSION SYSTEM. JAN. 18, 1977.

Class 25C 6

3,192,519.—DIGITAL TRANSIENT ANALYZER. JUNE 29, 1965.
3,376,490.—SYNTHESIZED WAVE STATIC INVERTERS. APR. 2, 1968.
3,508,080.—BRIDGE GATING NETWORK HAVING POWER GAIN. APR. 21, 1970.
3,555,540.—DIGITAL TO ANALOG CONVERTER WITH SMOOTHED RECOVERY. JAN. 12, 1971.
3,599,037.—GAS LAMP LEAD BALLAST CIRCUIT HAVING FEED CONTROL. AUG. 10, 1971. ARG. 0182960, BEL. 0749784, CAN. 0907126, FRA. 7015813, GRB. 1308525, ITL. 0900023, MEX. 0116550.
3,638,089.—SPEED CONTROL SYSTEM HAVING HIGH AND LOW LEVEL SPEED MEANS. JAN. 25, 1972. GRB. 1322611.
3,670,269.—AUTOMATIC TRANSVERSAL EQUALIZER. JUNE 13, 1972. CAN. 0932412, GRB. 1353018.
3,689,915.—ENCODING SYSTEM. SEPT. 5, 1972. CAN. 0870252, GER. 1562051, GRB. 1207701, JAP. 0675600.
3,691,542.—MAGNETIC MEMORY DISK DRIVE APPARATUS WITH REDUCED R.F. NOISE. SEPT. 12, 1972. GRB. 1328717, JAP. 0840914.
3,699,555.—APPARATUS FOR RAPID ACTION DISPLACEMENT CONTROL. OCT. 17, 1972. CAN. 985413, GRB. 1366124.
3,737,569.—TRANSMISSION DEVICE. [illegible]
3,742,374.—TRANSDUCER DEVICE. [illegible]
3,761,799.—CURRENT STABILIZING CIRCUIT HAVING MINIMAL LEAKAGE CURRENT EFFECTS. SEPT. 25, 1973. BEL. 0792285. FRA. 7243406, GRB. 1395600, ITL. 0971515, MEX. 131737.
3,778,817.—OUTPUT KEYBOARD APPARATUS AND SIGNAL TRANSLATING METHODS THEREFOR. DEC. 11, 1973.
3,795,857.—ELECTRICAL CONNECTOR TESTING APPARATUS HAVING A PLURALITY OF AND GATES. MAR. 5, 1974.
3,818,297.—MOTOR CONTROL APPARATUS. JUNE 18, 1974. CAN 1004296, GRB. 1454269.
3,832,065.—DRUM TRACK DETECTOR. AUG. 27, 1974. GRB. 1458283.
3,880,516.—DIAGNOSTIC CIRCUIT BOARD. APR. 29, 1975. BEL. 0808231, FRA. 7342590, GRB. 1447394, ITL. 1002163, SPN. 421149.
3,904,922.—LAMP CONTROL AND LAMP SWITCH CIRCUIT. SEPT. 9, 1975.
3,906,194.—SIGNAL PROCESSOR. SEPT. 16, 1975.
3,909,125.—STEPPER MOTOR CONTROL. SEPT. 30, 1975.
3,918,046.—DIGITAL TO ANALOG CONVERTER. NOV. 4, 1975. ARG. 0197211, BEL. 0795801, FRA. 7305890, GRB. 1417772, ITL. 0979289, MEX. 131264, SPN. 0411883, STZ. 0564887.
3,922,595.—HIGH POWER REGULATED D C SUPPLY. NOV. 25, 1975.
3,928,772.—TIME DEPENDENT FAULT DETECTOR. DEC. 23, 1975. BEL. 0826690.
3,989,371.—CYCLE-OUT LOGIC FOR A MULTI-MODE COPIER/DUPLICATOR. NOV. 2, 1976.
3,991,355.—STEPPER MOTOR CONTROL. NOV. 9, 1976.
4,002,409.—CHAIN-FEED CONTROL LOGIC FOR A MULTI-MODE COPIER/DUPLICATOR. JAN. 11, 1977. BEL. 0840300.

Class 26

D.225,572.—BOOK STACKING UNIT FOR XEROGRAPHIC REPRODUCTION MACHINE. DEC. 19, 1972.
D.231,127.—COPYING MACHINE-LARGE DOCUMENT COPYING FRAME-DECOY. APR. 2, 1974.
D.231,128.—COPYING MACHINE. APR. 2, 1974.
D.231,129.—COPYING MACHINE. APR. 2, 1974.
D.231,564.—COPYING MACHINE. APR. 30, 1974.
D.236,030.—PAPER TRAY. JULY 22, 1975.
D.236,446.—CART. AUG. 26, 1975.
D.236,491.—COMPUTER CABINET. AUG. 26, 1975.
D.236,897.—COMPUTER CABINET. SEPT. 23, 1975.
D.236,961.—BALANCE SCALE. SEPT. 30, 1975.
D.238,450.—PAPER CASSETTE. JAN. 13, 1976.
D.238,966.—COPIER EVENT RECORDER. FEB. 24, 1976.
D.239,063.—STORAGE UNIT. MAR. 9, 1976.
D.239,064.—STORAGE UNIT. MAR. 9, 1976.
D.239,065.—STORAGE UNIT. MAR. 9, 1976.
D.239,066.—STORAGE UNIT. MAR. 9, 1976.
D.239,067.—STORAGE AND DISPLAY UNIT. MAR. 9, 1976.
D.239,106.—SEMICONDUCTOR EDUCATIONAL BOARD. MAR. 9, 1976.
D.239,107.—PARALLEL RL/RC CIRCUITS EDUCATIONAL BOARD. MAR. 9, 1976.
D.239,108.—RLC CIRCUITS EDUCATIONAL BOARD. MAR. 9, 1976.
D.239,109.—SERIES RL AND RC CIRCUITS EDUCATIONAL BOARD. MAR. 9, 1976.
D.239,110.—EDUCATIONAL DEVICE FOR LEARNING ABOUT RECTIFIERS AND FILTERS. MAR. 9, 1976.

D.239,351.—STORAGE AND DISPLAY UNIT. MAR. 30, 1976.
D.239,392.—COMPUTER CABINET. MAR. 30, 1976.
D.239,750.—STORAGE UNIT. MAY 4, 1976.
D.239,995.—STORAGE UNIT. MAY 25, 1976.
D.240,192.—DESIGN FOR MICROFILM REEL. JUNE 8, 1976.
D.240,540.—COMPUTER TERMINAL. JULY 13, 1976.
D.240,554.—DUPLICATING MACHINE WITH SORTER. JULY 13, 1976.
D.240,555.—SORTER. JULY 13, 1976.
D.240,557.—TRAY RACK. JULY 13, 1976.
D.240,965.—COIN OPERATED REPRODUCTION MACHINE. AUG. 10, 1976.
D.241,982.—ADAPTER FOR COMPRESSING HUMAN BODY ORGANS FOR X-RAY TREATMENT OR THE LIKE. OCT. 19, 1976.

Class 26A

D.200,130.—XEROGRAPHIC CAMERA. JAN. 19, 1965.
D.200,448.—DOCUMENT REPRODUCING APPARATUS. FEB. 23, 1965.
D.205,806.—REPRODUCTION MACHINE. SEPT. 20, 1966.
D.227,933.—SORTER. JULY 24, 1973.
D.236,850.—CONTROL PANEL FOR A COPIER. SEPT. 16, 1975.
D.237,905.—CONTROL PANEL OF A COLOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. DEC. 2, 1975.
D.238,779.—DOCUMENT TRAY. FEB. 10, 1976.
D.238,818.—PLATEN COVER FOR COPIER. FEB. 10, 1976.
D.239,138.—XEROGRAPHIC COPIER. MAR. 9, 1976.

Class 26A 1

D.163,640.—XEROGRAPHIC COPYING DEVICE. JUNE 12, 1951.
D.165,993.—PAPER REGISTRATION GUIDE FOR ELECTROPHOTOGRAPHIC COPYING MACHINE. FEB. 19, 1952.
D.172,906.—A XEROGRAPHIC PROCESSOR. AUG. 24, 1954.
D.186,832.—DOCUMENT REPRODUCING APPARATUS. DEC. 8, 1959.
D.188,633.—DOCUMENT REPRODUCING APPARATUS. AUG. 16, 1960.
D.193,450.—DOCUMENT REPRODUCING APPARATUS. AUG. 21, 1962.
D.194,815.—DOCUMENT REPRODUCING APPARATUS. MAR. 12, 1963.
D.200,272.—DOCUMENT REPRODUCING APPARATUS. FEB. 9, 1965. CAN. 2092730.
D.200,448.—DOCUMENT REPRODUCING APPARATUS. FEB. 23, 1965.
D.205,558.—REPRODUCTION MACHINE. AUG. 16, 1966.
D.205,806.—REPRODUCTION MACHINE. SEPT. 20, 1966.
D.208,337.—XEROGRAPHIC DOCUMENT REPRODUCING APPARATUS OR SIMILAR ARTICLE. AUG. 15, 1967.
D.210,558.—DOCUMENT REPRODUCING MACHINE. MAR. 19, 1968.
D.210,630.—DOCUMENT REPRODUCING APPARATUS. MAR. 26, 1968.
D.210,856.—DOCUMENT REPRODUCING APPARATUS. APR. 23, 1968.
D.214,699.—DOCUMENT REPRODUCING MACHINE. JULY 15, 1969. ARG. 0011028, CAN. 2543184, MEX. 0011135.
D.218,199.—DOCUMENT REPRODUCING MACHINE. JULY 28, 1970. CAN. 0033011, GRB. 0946459.
D.218,201.—REPRODUCTION MACHINE. JULY 28, 1970. ARG. 0014313, BEL. 0017005, CAN. 0033518, CHL. 0000996, GRB. 0946818, JAP. 0363075, MEX. 0011194, PNM. 0002073, VZL. 0000744.
D.219,889.—XEROGRAPHIC PROCESSOR HOUSING. FEB. 9, 1971.
D.221,694.—XEROGRAPHIC PROCESS HOUSING. AUG. 31, 1971.
D.227,931.—ELECTROPHOTOGRAPHIC PRINTING MACHINE. JULY 24, 1973.
D.230,513.—REPRODUCTION MACHINE. FEB. 26, 1974.
D.238,737.—COPYING MACHINE STAND. FEB. 10, 1976.
D.243,008.—COIN OPERATED REPRODUCTION MACHINE. JAN. 11, 1977.

Class 26A 2

D.214,959.—AUTOMATIC DOCUMENT FEEDING APPARATUS FOR XEROGRAPHIC REPRODUCING MACHINES OR THE LIKE. AUG. 12, 1969. CAN. 0032540, GER. DES5715, GRB. 0942720.
D.227,034.—DOCUMENT FEEDER FOR A XEROGRAPHIC REPRODUCTION. MAY 29, 1973.

Class 26A 3

D.200,129.—XEROGRAPHIC TRANSFER AND FUSING APPARATUS. JAN. 19, 1965.
D.233,481.—XEROGRAPHIC VAPOR FUSING APPARATUS. OCT. 29, 1974.

Class 26A 4

D.201,405.—XEROGRAPHIC PRINTER. JUNE 15, 1965.
D.220,188.—MOBILE PRINTER. MAR. 16, 1971. CAN. 0033207, GER. 0MR6294, GRB. 0946460, JAP. 0443861.
D.230,517.—COMPUTER OUTPUT PRINTER. FEB. 26, 1974.
D.232,125.—CHARACTER PRINT MEMBER. JULY 16, 1974.
D.237,010.—COMBINED RIBBON AND CARTRIDGE THEREFOR. SEPT. 30, 1975. FRA. 0073134, GRB. 0967791, ITL. 0010845.
D.238,904.—CHARACTER PRINT MEMBER. FEB. 17, 1976.
D.238,968.—CHARACTER PRINT MEMBER. FEB. 24, 1976. FRA. 0073135, GER. 0009989, GRB. 0967792, ITL. 0010846.

Class 26A 5

D.200,130.—XEROGRAPHIC CAMERA. JAN. 19, 1965.

Class 26B

D.209,408.—CABINET FOR SORTING AND HOLDING SHEETS OF PRINTED MATERIAL. NOV. 28, 1967.
D.209,409.—MODULAR CABINET FOR SORTING AND HOLDING SHEETS OF PRINTED MATERIAL. NOV. 28, 1967.
D.209,872.—DOCUMENT REPRODUCING AND SORTING MACHINE. JAN. 9, 1968.
D.212,227.—A TAPE CONTRL UNIT FOR AN AUTOMATIC SORTER OR THE LIKE. SEPT. 17, 1968.
D.224,054.—XEROGRAPHIC REPRODUCTION MACHINE OR THE LIKE. JUNE 27, 1972.
D.230,515.—DOCUMENT REPRODUCING AND SORTING MACHINE. FEB. 26, 1974.
D.236,330.—REPRODUCTION MACHINE STACKING CART. AUG. 19, 1975.
D.236,924.—PAPER HANDLING STAND. SEPT. 30, 1975.
D.237,871.—REPRODUCTION MACHINE STACKING CART. DEC. 2, 1975.
D.238,779.—DOCUMENT TRAY. FEB. 10, 1976.

Class 26C

D.205,910.—A CAN. OCT. 4, 1966.
D.208,377.—CONTAINER FOR XEROGRAPHIC TONER POWDER. AUG. 22, 1967.
D.211,928.—BOTTLE. AUG. 13, 1968.
D.218,152.—CONTAINER FOR XEROGRAPHIC POWDER. JULY 28, 1970. CAN. 0032629, GRB. 0944047.
D.236,694.—DEVELOPER MIX STORAGE CONTAINER. SEPT. 9, 1975.
D.240,201.—TONER PARTICLE STORAGE CONTAINER-DESIGN FOR TONER CARTRIDGE. JUNE 8, 1976.
D.244,007.—TONER BOTTLES. APR. 12, 1977.

Class 26D

D.216,647.—SPRING SCALE. FEB. 24, 1970. CAN. 0032577, GRB. 0943939.
D.220,011.—ARTICLE ADDRESSING MACHINE. FEB. 23, 1971.
3,666,948.—LIQUID CRYSTAL INFRARED IMAGING SYSTEM HAVING AN UNDISTURBED IMAGE ON A DISTURBED BACKGROUND. MAY 30, 1972. CAN. 0964455, GRB. 1387276.
3,737,896.—APPARATUS FOR RECOVERY OF RECORDED BIT INFORMATION IN A MAGNETIC RECORDING MEDIUM. JUNE 5, 1973. AUS. 0471989, BEL. 0790688, CAN. 1008967, STZ. 0563642.

Class 26E

D.200,128.—FACSIMILE RECEIVER. JAN. 19, 1965.

Class 26E 1

D.200,127.—FACSIMILE TRANSMITTER. JAN. 19, 1965.
D.200,128.—FACSIMILE RECEIVER. JAN. 19, 1965.

D.215,218.—FACSIMILE TRANSCEIVER. SEPT. 16, 1969. ARG. 0010244, BEL. 0016600, CAN. 2493134, FRA. 0096592, GER. 0005411, GRB. 0939330, ITL. 0134198. MEX. 0010900.
D.218,170.—FACSIMILE TRANSCEIVER. JULY 28, 1970. GRB. 0944047.
D.225,860.—HOUSING FOR ELECTRONIC APPARATUS. JAN. 9, 1973.
D.225,861.—HOUSING FOR ELECTRONIC APPARATUS. JAN. 9, 1973.
D.225,867.—UNATTENDED TELEPHONE ANSWERING APPARATUS OR SIMILAR ARTICLE. JAN. 9, 1973.
D.227,121.—FACSIMILE TRANSCEIVER APPARATUS. JUNE 5, 1973.
D.227,122.—FACSIMILE TRANSCEIVER APPARATUS. JUNE 5, 1973.

Class 26E 2

D.215,849.—A ROLL-FEED APPARATUS FOR A FACSIMILE TRANSCEIVER. NOV. 4, 1969. ARG. 0011067, BEL. 0016764, CAN. 0032344, GER. DES5719, GRB. 0942723, ITL. 0138774, MEX. 0010975, PNM. 0001983, VZL. 0000663.
D.216,123.—FLEXIBLE SHEET MATERIAL GUIDE FOR A FACSIMILE TRANSCEIVER OR SIMILAR ARTICLE. NOV. 25, 1969. GRB. 0942748.
D.216,564.—GUIDE FOR FLEXIBLE SHEET MATERIAL FOR FACSIMILE TRANSCEIVER OR SIMILAR ARTICLE. FEB. 10, 1970. ARG. 0011068, BEL. 0016763, GER. DES5716, GRB. 0942723, ITL. 0138775, MEX. 0011018, PNM. 0001401, VZL. 0000662.

Class 26E 3

D.210,589.—ELECTRONIC ADAPTER FOR FACSIMILE COMPUTER SYSTEM. MAR. 26, 1968.

Class 26F

D.203,012.—DESIGN FOR A MACHINE FOR APPLYING INTELLIGENCE TO A MOVING ARTICLE. NOV. 23, 1965.
D.244,943.—FILM REEL (DESIGN). JULY 5, 1977.

Class 26F 1

D.202,746.—MICROFICHE PRINTER. NOV. 2, 1965.
D.217,739.—COMBINED MICROFILM VIEWER AND REPRODUCING MACHINE ACCESSORY. JUNE 2, 1970. CAN. 0032698.
D.218,782.—PROJECTION VIEWER. SEPT. 22, 1970. CAN. 0033031, GER. OMR6147, GRB. 0945494, JAP. 413894.
D.218,783.—COMBINATION FILM VIEWING AND REPRODUCING MACHINE. SEPT. 22, 1970. CAN. 0033032, GER. OMR6146, GRB. 0945495, JAP. 0377263.
D.233,369.—MICROFILM XEROGRAPHIC MACHINE. OCT. 22, 1974.
D.236,544.—MICROFORM VIEWER. AUG. 26, 1975.
D.239,055.—HAND-HELD VIEWER FOR MICROFORMS. MAR. 2, 1976.
D.239,056.—HAND-HELD VIEWER FOR MICROFORMS. MAR. 2, 1976.

Class 26G

D.225,643.—REACTION TESTING DEVICE. DEC. 26, 1972.
D.225,681.—SUCTION MOUNTING DEVICE. DEC. 26, 1972.
D.226,662.—EDUCATIONAL DEVICE FOR DEMONSTRATING MOMENTUM. APR. 10, 1973.
D.232,030.—EDUCATIONAL AID FOR DEMONSTRATING PRINCIPLES IN PHYSICS. JULY 9, 1974.
D.232,031.—COLLISION DEMONSTRATION TEACHING AID. JULY 9, 1974.
D.232,098.—TEACHING AID FOR DEMONSTRATING PRINCIPLES IN PHYSICS. JULY 16, 1974.
D.232,698.—CLAMP. SEPT. 10, 1974.
D.233,432.—TEACHING AID FOR DEMONSTRATING PRINCIPLES OF PHYSICS. OCT. 29, 1974.
D.233,654.—CONTAINER FOR BOOKLETS OR THE LIKE. NOV. 19, 1974.
D.233,658.—BALANCE SCALE. NOV. 19, 1974.
D.233,935.—EDUCATIONAL DEVICE FOR TEACHING ARITHMETIC. DEC. 17, 1974.
D.234,546.—CARRYING CASE. MAR. 18, 1975.
D.235,440.—EDUCATIONAL PLUG-IN BOARD. JUNE 17, 1975.
D.235,441.—BASIC MEASUREMENT EDUCATIONAL BOARD. JUNE 17, 1975.
D.236,028.—MAGNIFIER. JULY 22, 1975.
D.236,729.—EDUCATIONAL PLUG-ON BOARD. SEPT. 9, 1975.
D.236,730.—EDUCATIONAL PLUG-ON BOARD. SEPT. 9, 1975.
D.236,978.—SWITCHING EDUCATIONAL BOARD. SEPT. 30, 1975.
D.236,979.—EDUCATIONAL MEASURING DEVICE BOARD. SEPT. 30, 1975.
D.237,020.—COMBINED SUPPORT AND STORAGE TRAY FOR AN EDUCATIONAL KIT OR SIMILAR ARTICLE. SEPT. 30, 1975.
D.237,877.—MOTOR AND GENERATOR EDUCATIONAL BOARD. DEC. 2, 1975.
D.237,878.—MULTI-METER EDUCATIONAL BOARD. DEC. 2, 1975.
D.237,879.—EDUCATIONAL DEVICE FOR LEARNING MAGNETISM & INDUCTION. DEC. 2, 1975.
D.237,880.—EDUCATIONAL DEVICE FOR LEARNING BASIC HAND TOOLS. DEC. 2, 1975.
D.242,787.—AN EDUCATIONAL AIDE FOR MEASURING MASS. DEC. 21, 1976.
D.242,793.—EDUCATIONAL AIDE FOR TEACHING PHYSICAL PROPERTIES OF LIGHT. DEC. 21, 1976.

Class 26G 1

D.216,157.—BALANCE SCALE. NOV. 25, 1969. BEL. 0016761, CAN. 0032611, GER. DES5718, GRB. 0942720, ITL. 0138772, JAP. 0337548.
D.236,731.—CURCUIT TESTING EDUCATIONAL BOARD. SEPT. 9, 1975.

Class 26H

D.236,556.—CARRYING CASE FOR COLORISTS MATERIALS OR THE LIKE. AUG. 26, 1975.

Class 26H 1

D.215,294.—HOUSING FOR ELECTRONIC APPARATUS. SEPT. 23, 1969. ARG. 0011066, BEL. 0016760, GER. 0005765, GRB. 0942725, ITL. 0138776, MEX. 0010934, PNM. 0001839, VZL. 0000664.
D.215,660.—HOUSING FOR ELECTRONIC APPARATUS. OCT. 21, 1969.
D.234,700.—DISC DRIVE CABINET. APR. 1, 1975.
D.238,494.—CONTROL PANEL FOR DISK FILE. JAN. 20, 1976.
D.238,495.—DISK MEMORY MODULE FRONT PANEL. JAN. 20, 1976.
D.240,632.—CABINET FOR ELECTRONIC EQUIPMENT. JULY 20, 1976.
D.241,446.—SINGLE MAGNETIC CARD CONSOLE UNIT FOR ELECTRONIC TYPING SYSTEM. SEPT. 14, 1976.
D.241,447.—SINGLE MAGNETIC TAPE CONSOLE UNIT FOR ELECTRONIC TYPING SYSTEM. SEPT. 14, 1976.
D.241,448.—DUAL MAGNETIC TAPE CONSOLE UNIT FOR ELECTRONIC TYPING SYSTEM. SEPT. 14, 1976.
D.241,449.—DUAL MAGNETIC CARD CONSOLE UNIT FOR ELECTRONIC TYPING SYSTEM. SEPT. 14, 1976.

Class 26H 2

D.221,228.—KEYBOARD FOR A COMPUTER OR THE LIKE. JULY 20, 1971.

Class 26H 3

D.221,229.—SEND/RECEIVE DATA PRINTER TERMINAL. JULY 20, 1971.
D.224,019.—XEND/RECEIVE DATA PRINTER TERMINAL. JUNE 27, 1972.
D.236,129.—INPUT/OUTPUT TERMINAL. JULY 29, 1975.

Class 26H 4

D.212,692.—TELEPHONE ACOUSTIC COUPLER. NOV. 12, 1968. ARG. 0010245, BEL. 0016601, CAN. 2503147, FRA. 0096593. GER. 0005410, GRB. 0939331, ITL. 1341991, MEX. 0010845.
D.224,025.—ACOUSTIC COUPLER. JUNE 27, 1972.

Class 26H 5

D.204,319.—HOLLOW CORNER PRISM. APR. 5, 1966.
D.206,956.—HOLLOW CORNER PRISM. FEB. 14, 1967.
D.237,849.—COOLING RACK. DEC. 2, 1975.

Class 26H 6

D.221,108.—PAPER SHREDDER. JULY 6, 1971. CAN. 0033939.

Class 26H 7

D.221,901.—OVERHEAD PROJECTOR. SEPT. 14, 1971. CAN. 0033920.
D.231,800.—RIBBON CARTRIDGE. JUNE 11, 1974.
D.236,787.—BOOKCASE OR SIMILAR ARTICLE. SEPT. 16, 1975.
D.239,419.—TAPE CASSETTE STORAGE UNIT. MAR. 30, 1976.
D.239,472.—MAGNETIC CARD STORAGE TRAY. APR. 6, 1976.
D.239,531.—COPY HOLDER. APR. 13, 1976.
D.239,872.—CAMERA/PROJECTOR. MAY 11, 1976.
D.241,774.—PRINTER/KEYBOARD APPARATUS FOR ELECTRONIC TYPING SYSTEM OR SIMILAR ARTICLE. OCT. 5, 1976.
D.242,101.—FILE UNIT OR SIMILAR ARTICLE. NOV. 2, 1976.
D.242,102.—TABLE OR SIMILAR ARTICLE. NOV. 2, 1976.

Class 27A

3,615,614.—LIGHT DEV DIRCT PRINT SILVER HALIDE EMULSION SENSITIZD W/ COMBINTN OF COPPER, LEAD, BROMIDE AND THIOU. OCT. 26, 1971.
3,660,100.—DIRECT-PRINT LIGHT DEVELOPABLE EMULSION. MAY 2, 1972.
3,725,073.—LIGHT DEVELOPABLE DIRECT WRITING, SILVER HALIDE EMULSIONS CONTAINING GOLD, IODINE, LEAD AND COP. APR. 3, 1973. CAN. 0882613.
3,782,960.—DRCT-PRNT LIGHT-DVLPBL EMULSN CNTAING SILVER HALIDE GRAINS SNSTZD SENSTZD ON THE SURFACES W/SI. JAN. 1, 1974. BEL. 0780680, CAN. 0994590, GRB. 1384081, ITL. 0950280.
3,849,146.—DIRECT-PRINT LIGHT-DEVELOPBL SILVER HALIDE EMULSION CONTAINING CYCLIC DIOXIDE OR SELENONE AS SEN. NOV. 19, 1974.

Class 27B

3,631,232.—APPARATUS FOR SIMULATING THE ELECTRICAL CHARACTERISTICS OF A NETWORK. DEC. 28, 1971. CAN. 0951429, GRB. 1267785.

Class 27C

2,298,997.—PHOTOGRAPHIC FILM. OCT. 13, 1942.
2,317,257.—METHOD OF DYEING PHOTOGRAPHIC SILVER HALIDE EMULSIONS. APR. 20, 1943.
2,320,693.—DUPLEX PHOTOGRAPHIC MATERIAL. JUNE 1, 1943.
2,352,822.—PHOTOGRAPHIC COATING. JULY 4, 1944.
2,653,152.—CYANINE DYE AND PROCESS OF MAKING SAME. SEPT. 22, 1953.
2,827,428.—PHOTOGRAPHIC EMULSION PURIFICATION-IONICS. MAR. 18, 1958.
3,736,133.—TRANSPARENT INK—ABSORBENT LACQUERS. MAY 29, 1973. ARG. 0193996, CAN. 0985583, GRB. 1390137, MEX. 0127276, VZL. 0033577.
3,773,513.—DIMENSIONALLY STABLE PHOTOGRAPHIC PAPER CONTAINING GLASS FIBERS. NOV. 20, 1973.

Class 27D

RE.22,654.—PHOTOGRAPHIC DEVELOPING MACHINE—RE OF 2,347,189-D3946. JULY 3, 1945.
2,347,189.—PHOTOGRAPHIC DEVELOPING MACHINE—REISSUED D348-22,654. APR. 25, 1944.
3,393,362.—PROCESS FOR DETECTING IRREGULARITIES IN A METALLIC SURFACE. JULY 16, 1968.

Class 30

3,861,911.—IMAGING FIXING METHOD. JAN. 21, 1975.

Class 30A

3,573,904.—COMBINATION OF ELECTROGRAPHY AND MANIFOLD IMAGING. APR. 6, 1971. ARG. 0188621, AUS. 0408972, BEL. 0708975, CAN. 0883746, FRA. 1563782, GER. 1671591, GRB. 1215957, ITL. 0822303, JAP. 0620886, MEX. 0100810, VZL. 0023682.
3,707,368.—MANIFOLD IMAGING PROCESS. DEC. 26, 1972.
3,741,762.—MANIFOLD IMAGING MEMBER AND PROCESS. JUNE 26, 1973. CAN. 0961909, GRB. 1376391.
3,955,975.—MANIFOLD IMAGING MEMBER AND PROCESS EMPLOYING A METAL SOAP. MAY 11, 1976.

Class 30B

3,642,363.—MANIFOLD IMAGING SYSTEM. FEB. 15, 1972. CAN. 0960289, GRB. 1328405, JAP. 0770137.
3,661,454.—COMBINATION OF ELECTROGRAPHY AND MANIFOLD IMAGING. MAY 9, 1972.
3,684,362.—TRANSPARENT ELECTRODE. AUG. 15, 1972. CAN. 0932378, GRB. 1340685, JAP. 0758465.
3,741,641.—MANIFOLD IMAGING APPARATUS. JUNE 26, 1973.
3,748,034.—MANIFOLD IMAGING MACHINE. JULY 24, 1973. BEL. 0777713, CAN. 0948694, FRA. 7200999, GRB. 1376661, ITL. 0946353, SPN. 0398585, SWD. 7200573.
3,761,174.—MANIFOLD WEB HANDLING. SEPT. 25, 1973.
3,768,902.—MANIFOLD IMAGING. OCT. 30, 1973.
3,876,937.—LAYER TRANSFER IMAGING SYSTEM. APR. 8, 1975. CAN. 0933996, GRB. 1282725, JAP. 0726369.
3,963,340.—IMAGING APPARATUS. JUNE 15, 1976.

Class 30C

3,615,393.—MANIFOLD IMAGING PROCESS EMPLOYING STATIC CHARGE FIELD APPLICATION. OCT. 26, 1971. BEL. 0746582, CAN. 0965829, FRA. 7007627, GRB. 1295533, ITL. 0886478, JAP. 0727962.
3,653,892.—MANIFOLD IMAGING PROCESS WHEREIN THE IMAGED ELEMENTS MAY BE RECOMBINED AND REUSED. APR. 4, 1972. CAN. 0916967, GRB. 1320407, JAP. 0731611.
3,676,116.—IMAGE REVERSAL IN MANIFOLD IMAGING USING ELECTRICALLY CONDUCTIVE RECEIVER SHEET. JULY 11, 1972.
3,684,362.—TRANSPARENT ELECTRODE. AUG. 15, 1972. CAN. 0932378. GRB. 1340685, JAP. 0758465.
3,692,516.—MANIFOLD IMAGING METHOD - PHAROS MANIFOLD IMAGING REVERSAL. AUG. 19, 1972. CAN. 0929204, GRB. 1320012, JAP. 0759476.
3,692,518.—MANIFOLD IMAGING PROCESS. SEPT. 19, 1972. ARG. 0191965, BEL. 0749174, CAN. 0916496, FRA. 7013872, GRB. 1309649, ITL. 0899700, JAP. 0731228, MEX. 0116175.
3,718,462.—MANIFOLD ELECTRIFICATION PROCESS. FEB. 27, 1973. CAN. 0947366, GRB. 1313712, JAP. 0739530.
3,737,311.—ELECTROSTATIC PARTICLES TRANSFER IMAGING PROCESS. JUNE 5, 1973.
3,756,812.—MANIFOLD IMAGING PROCESS. SEPT. 4, 1973.
3,761,258.—IMAGING PROCESS EMPLOYING CHARGED DONOR AND RECEIVER SHEETS. SEPT. 25, 1973.
3,776,721.—MANIFOLD IMAGING. DEC. 4, 1973.
3,844,780.—IMAGING PROCESS. OCT. 29, 1974.
3,846,127.—IMAGING SYSTEM. NOV. 5, 1974.
3,850 626.—IMAGING MEMBER AND METHOD. NOV. 26, 1974. GRB. 1464653.
3,854,943.—MANIFOLD IMAGING METH AND MEMBR EMPLOYING FUNDAMENTAL PARTICLES OF ALPHA METAL FREE PHTHALOCYANINE. DEC. 17, 1974. CAN. 0988766, GRB. 1424234.
3,861,910.—MANIFOLD IMAGING PROCESS. JAN. 21, 1975. ARG. 0198477, BEL. 0744343, CAN. 0947363, FRA. 7001127, GRB. 1284521, ITL. 0885940, JAP. 0727960, MEX. 0111440.
3,909,257.—MANIFOLD IMAGING PROCESS WITH SPOOL ELECTRODE. SEPT. 30, 1975.

Class 30D

3,598,581.—MANIFOLD IMAGING METHOD. AUG. 10, 1971. ARG. 0198157, AUS. 0413154, BEL. 0713100, BRA. 6795099, CAN. 0889250, CHL. 0024249, CLB. 0017928, FRA. 1560020, GER. 1772114, GRB. 1200712, HOL. 0149611, ITL. 0829693, JAP. 0626106, LXB. 0055806, MEX. 0100797, NOR. 0128040, PRU. 0009737, SPN. 0352316, STZ. 0474097, SWD. 0340404, URG. 0009203, VZL. 0023690.
3,723,112.—MANIFOLD IMAGING METHOD WHEREIN THE ACTIVATOR CARRIES A PLASTIC COATING MATERIAL. MAR. 27, 1973.
3,741,762.—MANIFOLD IMAGING MEMBER AND PROCESS. JUNE 26, 1973. CAN. 0961909, GRB. 1376391.

3,907,558.—MANIFOLD IMAGING UTILIZING SILICA GEL ACTIVATING LAYER. SEPT. 23, 1975.
3,912,504.—MANIFOLD IMAGING WITH THERMAL ACTIVATOR CONTAINED IN A SILICA GEL LAYER. OCT. 14, 1975.
3,955,975.—MANIFOLD IMAGING MEMBER AND PROCESS EMPLOYING A METAL SOAP. MAY 11, 1976.
3,964,904.—MANIFOLD IMAGING MEMBER AND PROCESS EMPLOYING A DARK CHARGE INJECTING LAYER. JUNE 22, 1976. BEL. 0832405.
4,015,983.—A METHOD OF ERASING MANIFOLD IMAGES. APR. 5, 1977.

Class 30E

3,653,889.—METHOD OF FIXING MANIFOLD IMAGES. APR. 4, 1972. BEL. 0754024, CAN. 0921745, FRA. 7028279, GRB. 1322772, ITL. 0900939, JAP. 0739529.
3,658,519.—IMAGE TRANSFER PROCESS FROM CONDUCTIVE SUBSTRATES. APR. 25, 1972. ARG. 0195536, AUS. 0456406, BEL. 0760747, BRA. 7022093, CAN. 0960290, FRA. 7047144, GRB. 1337590, ITL. 0913848, MEX. 0119590, SWD. 7017293.
3,706,553.—TRANSFER OF IMAGES TO A NON-CONDUCTIVE SUBSTRATE. DEC. 19, 1972. ARG. 0203811, AUS. 0461437, BEL. 0760456, CAN. 0947368, FRA. 7047140, GRB. 1339577, ITL. 0913634, MEX. 0119591, SWD. 7017139.
3,708,288.—IMAGE TRANSFER PROCESS. JAN. 2, 1973. CAN. 0882053, GRB. 1298922, JAP. 0757867.
3,723,112.—MANIFOLD IMAGING METHOD WHEREIN THE ACTIVATOR CARRIES A PLASTIC COATING MATERIAL. MAR. 27, 1973.
3,746,538.—IMAGE TRANSFER PROCESS. JULY 17, 1973. CAN. 0951781, GRB. 1374841.
3,793,017.—IMAGING FIXING METHOD. FEB. 19, 1974.
3,819,368.—MANIFOLD IMAGING MEMBER EMPLOYING A FIXATIVE LAYER. JUNE 25, 1974.
3,825,423.—IMAGE TRANSFER PROCESS. JULY 23, 1974.
3,888,208.—IMAGE TRANSFER PROCESS. JUNE 10, 1975.

Class 30F

3,548,748.—DUPLICATING METHOD EMPLOYING SIMULTANEOUS APPLICATION OF ELECTRIC FIELD AND EXPOSURE TO RADIATION. DEC. 22, 1970. CAN. 0882051, GRB. 1227394, JAP. 0752522.
3,554,125.—METHOD OF MAKING A LITHOGRAPHIC MASTER AND METHOD OF PRINTING THEREWITH. JAN. 12, 1971. CAN. 0882052, GER. 1772302, GRB. 1219849.
3,565,612.—DUPLICATING MASTERS BY THE MANIFOLD PROCESS. FEB. 23, 1971. ARG. 0193797, AUS. 0411612, BEL. 0708974, CAN. 0873277, FRA. 1549964, GER. 1671590, GRB. 1215956, ITL. 0823464, MEX. 0106608, VZL. 0023681.
3,573,904.—COMBINATION OF ELECTROGRAPHY AND MANIFOLD IMAGING. APR. 6, 1971. ARG. 0188621, AUS. 0408972, BEL. 0708975, CAN. 0883746, FRA. 1563782, GER. 1671591, GRB. 1215957, ITL. 0822303, JAP. 0620886, MEX. 0100810, VZL. 0023682.

Class 30G

3,655,372.—IMAGE REVERSAL IN MANIFOLD IMAGING. APR. 11, 1972.
3,901,697.—MANIFOLD IMAGING PROCESSUSING ELECTRONICS PHOTOSENSITIVE MATERIAL SUBJECT TO LIGHT FATIGUE. AUG. 26, 1975.

Class 30H

3,649,117.—IMAGING PROCESS. MAR. 14, 1972. BEL. 0761133, CAN. 0985732, FRA. 7047700, GRB. 1340679, ITL. 0914070, JAP. 0759480.
3,918,967.—CONTACT REFLEX MANIFOLD IMAGING PROCESS. NOV. 11, 1975. ARG. 0183676, BEL. 0761132, CAN. 0949120, FRA. 7047699, GRB. 1340207, ITL. 0914069, JAP. 0770143, MEX. 0119757, VZL. 0032600.

Class 30I

3,556,783.—COLOR MANIFOLD IMAGING PROCESS. JAN. 19, 1971.
3,853,555.—METHOD OF COLOR IMAGING A LAYER OF ELECTRICALLY PHOTOSENSITIVE AGGLOMERATES. DEC. 10, 1974.
3,854,943.—MANIFOLD IMAGING METH AND MEMBR EMPLOYING FUNDAMENTAL PARTICLES OF ALPHA METAL FREE PHTHALOCYANINE. DEC. 17, 1974. CAN. 0988766, GRB. 1424234.

Class 31

3,719,951.—WRAP ADJUST DEVICE FOR CONTROLLING ENGAGEMENT BETWEEN A WEB AND ROLLER IN AN IMAGING SYSTEM. MAR. 6, 1973. CAN. 0995295, GRB. 1406047.

Class 31A

3,520,681.—PHOTOELECTROSOLOGRAPHY. JULY 14, 1970. BRA. 0084241, CAN. 0852692, MEX. 0085656.
3,801,314.—IMAGING SYSTEM. APR. 2, 1974.
3,975,195.—MIGRATION IMAGING SYSTEM. AUG. 17, 1976.
4,009,028.—REVERSE MIGRATION IMAGING SYSTEM. FEB. 22, 1977. BEL. 0827065.
4,013,462.—MIGRATION IMAGING SYSTEM. MAR. 22, 1977.

Class 31B

3,528,355.—CAMERA-PROCESSOR. SEPT. 15, 1970. ARG. 0184627, ATR. 0303513, AUS. 0426557, BEL. 0720022, BRA. 6800654, CAN. 0864811, CHL. 0024251, CLB. 0018453, FRA. 1586179, GER. 1797177, GRB. 1244641, IND. 0117458, ITL. 0839895, LXB. 0056774, MEX. 0103737, NOR. 0128296, NZL. 0153587, PLP. 0006313, PNM. 0001980, PRU. 0010212, PTG. 0050229, SPN. 0357651, STZ. 0516171, SWD. 0338503, URG. 0009309, VZL. 0023698.
3,542,465.—CAMERA WITH DEVELOPMENT MEANS. NOV. 24, 1970. CAN. 0918739, GRB. 1241846, JAP. 0650672.
3,719,951.—WRAP ADJUST DEVICE FOR CONTROLLING ENGAGEMENT BETWEEN A WEB AND ROLLER IN AN IMAGING SYSTEM. MAR. 6, 1973. CAN. 0995295, GRB. 1406047.
3,770,554.—APPARATUS FOR SPLITTING A SOFTENABLE FILM COMPRISING BITE ROLLERS. NOV. 6, 1973.
3,878,816.—IMAGING SYSTEM. APR. 22, 1975.
3,910,475.—SYSTEM FOR ELECTRICALLY GROUNDING OR BIASING A MEMBER. OCT. 7, 1975. FRA. 7404995, ITL. 1007663.
3,951,324.—CAMERA/PROCESSOR/PROJECTOR & SUBSYSTEMS. APR. 20, 1976. FRA. 7439865.
4,025,183.—CAMERA/PROCESSOR/PROJECTOR & SUBSYSTEMS. MAY. 24, 1977. FRA. 7439865.

Class 31C

3,556,781.—MIGRATION IMAGING PROCESS. JAN. 19, 1971. ARG. 0175887, AUS. 0425096, BEL. 0722718, CAN. 0874909, CHL. 0024333, FRA. 1587222, GER. 1804475, GRB. 1250526, GUA. 0002124, ITL. 0855511, MEX. 0103409, PNM. 0001949, PRU. 0010349, SPN. 0359501, STZ. 0506818, SWD. 0340750, URG. 0009365, VZL. 0023713.
3,615,400.—MIGRATION IMAGING SYSTEM EMPLOYING CARBON LAYER BETWEEN SOLVENT SOLUBLE LAYR AND CONDUCTIVE LAYER. OCT. 26, 1971. ATR. 0306509, AUS. 0433959, BEL. 0726279, CAN. 0874906, DNK. 0129015, FRA. 1598889, GRB. 1261360, ITL. 0850165, LXB. 0057703, NOR. 0127265, NZL. 0154928, SAF. 0688514, SPN. 0380191, STZ. 0512755, SWD. 7210413.
3,653,885.—PROCESS OF STABILIZING A MIGRATION IMAGE COMPRISING SELENIUM PARTICLES. APR. 4, 1972. CAN. 0937437.
3,656,990.—ELECTROSOLOGRAPHY. APR. 18, 1972. ARG. 0152723, BRA. 0084169, CAN. 0800550, CHL. 0025766. CLB. 0014944, MEX. 0086246, PNM. 0002518, PRU. 0009465, URG. 0008153, VZL. 0023999.
3,664,834.—MIGRATION IMAGING METHOD EMPLOYING ADHESIVE TRANSFER MEMBER. MAY 23, 1972. CAN. 0890353, GER. 1964201, GRB. 1291848, JAP. 0726370.
3,713,818.—MIGRATION IMAGING SYSTEM WITH MOLTEN LIQUID DEVELOPMENT. JAN. 30, 1973. CAN. 0933580, GRB. 1358566, USR. 0463275.
3,719,482.—IMAGING SYSTEM. MAR. 6, 1973.
3,720,513.—MIGRATION IMAGING METHOD INVOLVING SOLVENT WASH-AWAY OF UNMIGRATED PARTICLES. MAR. 13, 1973.
3,723,113.—POLYCHROMATIC ELECTROSOLOGRAPHIC. MAR. 27, 1973.

3,740,216.—PHOTOELECTROCOLOGRAPHIC IMAGING EMPLOYING A RELEASABLE IMAGING LAYER. JUNE 19, 1973.

3,741,757.—MIGRATION IMAGE DEVELOPMENT BY SPLITTING OR ABRADING SOFTENABLE LAYER. JUNE 26, 1973. ATR. 0306510, AUS. 0441768, BEL. 0743209, CAN. 0915960, FRA. 6943268, GER. 1961754, GRB. 1297129, ITL. 0879120, JAP. 0725058, PNM. 0001554, SPN. 0374618, SWD. 0358750, VZL. 0032779.

3,753,706.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD WHEREIN AN ABSORBENT MATERIAL IS USED. AUG. 21, 1973. CAN. 0945796, GRB. 1334141, JAP. 0766711.

3,791,822.—REMOVAL OF BACKGROUND FROM AN IMAGED MIGRATION LAYER. FEB. 12, 1974. ATR. 0306510, AUS. 0441768, BEL. 0743209, CAN. 0915960, FRA. 6943268, GER. 1961754, GRB. 1297129, ITL. 0879120, JAP. 0725058, PNM. 0001554, SPN. 0374618, SWD. 0358750, VZL. 0032779.

3,795,512.—IMAGING SYSTEM. MAR. 5, 1974. ARG. 0188187, ATR. 0301340, AUS. 0429441, BEL. 0725617, BRA. 0088091, CAN. 0883747, DNK. 0131212, FRA. 1599277, GER. 1815217, GRB. 1257189, ITL. 0849328, JAP. 0686721, LXB. 0057585, MEX. 0101986, NOR. 0128084, NZL. 0154842, PTG. 0050858, SAF. 0688365, SPN. 0361650, STZ. 0523523, SWD. 0341128, VZL. 0023715.

3,798,030.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD UTILIZING POWDER PARTICLES. MAR. 19, 1974.

3,820,984.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD USING FUSIBLE PARTICLES. JUNE 28, 1974.

3,836,362.—IMAGING METHOD. SEPT. 17, 1974.

3,839,030.—MIGRATION IMAGING PROCESS WITH UNIFORM EXPOSURE BEFORE OR DURING THE SOFTENING STEP. OCT. 1, 1974. BEL. 0715790. CAN. 0890853, FRA. 1572571, GER. 1772523, GRB. 1234652, ITL. 0834777, JAP. 0620888.

3,839,031.—ELECTRODE DEVELOPMENT MIGRATION IMAGING METHOD. OCT. 1, 1974. ARG. 0184241, AUS. 0456843, BEL. 0755599, CAN. 0947367, FRA. 7032000, GRB. 1326950, ITL. 0907387, JAP. 0766709, MEX. 0120156, SPN. 0383314, SWD. 0369115.

3,840,397.—PARTICLE PLACING SYSTEM. OCT. 8, 1974. ARG. 0175888, ATR. 0300561, AUS. 0427473, BEL. 0724135, CAN. 0868305, DNK. 0126727, FRA. 1593258, GER. 1810079, GRB. 1254448, ITL. 0948025, JAP. 0708364, LXB. 0057367, MEX. 0107468, NOR. 0127216, NZL. 0154542, PNM. 0002048, PTG. 0050687, SAF. 0687633, SPN. 0360458, STZ. 0501251, SWD. 0341724, VZL. 0023710.

3,866,236.—IMAGING PROCESS USING VERTICAL PARTICLE MIGRATION. FEB. 11, 1975. CAN. 0936735, GRB. 1360623.

3,873,309.—IMAGING METHOD USING MIGRATION MATERIAL. MAR. 25, 1975. CAN. 978008, GRB. 1357143.

3,878,816.—IMAGING SYSTEM. APR. 22, 1975.

3,894,869.—A POLYCHROMATIC MIGRATION IMAGING SYSTEM. JULY 15, 1975.

3,901,699.—MIGRATION AND AGGLOMERATION IMAGING METHOD. AUG. 26, 1975.

3,910,475.—SYSTEM FOR ELECTRICALLY GROUNDING OR BIASING A MEMBER. OCT. 7, 1975. FRA. 7404995, ITL. 1007663.

3,912,505.—COLOR IMAGING METHOD EMPLOYING A MONOLAYER OF BEADS. OCT. 14, 1975. ARG. 0179561, AUS. 0426600, BEL. 0723097, CAN. 0890354, CHL. 0024276, FRA. 1587252, GRB. 1248744, GUA. 0002327, HOL. 0151526, ITL. 0845607, JAP. 0731223, MEX. 0107801, PNM. 0001814, PRU. 0010425, SPN. 0377583, STZ. 0526138, SWD. 0351501, URG. 0009366, VZL. 0023708.

3,917,880.—ELECTROPHOTETIC IMAGING SYSTEM. NOV. 4, 1975. GRB. 1459468.

3,918,969.—MIGRATION IMAGING METHOD EMPLOYING A UNIFORM EXPOSURE STEP. NOV. 11, 1975. ARG. 0172557, ATR. 0300565, AUS. 0430615, BEL. 0726282, CAN. 0883748, DNK. 0124046, FRA. 1598888, GER. 1817222, GRB. 1257030, ITL. 0850166, JAP. 0665999, LXB. 0057692, MEX. 0107941, NOR. 0127264, NZL. 0154930. PNM. 0001958, SAF. 0688516, SPN. 0362041, STZ. 0506822, SWD. 0340953, VZL. 0023721.

3,933,491.—IMAGING SYSTEM. JAN. 20, 1976.

3,950,167.—IMAGING SYSTEM. APR. 13, 1976. FRA. 7432507.

3,960,555.—PROCESS-PESO WITH CONDUCTORLESS BASE. JUNE 1, 1976. BEL. 0713103, BRA. 0088021, CAN. 0890858, CHL. 0023981, FRA. 1576403, IND. 0115236, ITL. 0829694, LXB. 0055807, MEX. 0096676, PRU. 0009941, SAF. 68/2105, SPN. 0352317, URG. 0009135, VZL. 0023691.

3,966,465.—MULTIPLE LAYER MIGRATION IMAGING SYSTEM. JUNE 29, 1976. BEL. 0773383, CAN. 0960286, FRA. 7135575, GRB. 1370146, ITL. 0938874.

3,967,959.—MIGRATION IMAGING SYSTEM. JULY 6, 1976.

3,970,453.—IMAGING BY SELECTIVE STRIPPING OUT AREAS OF LAYER. JULY 20, 1976.

3,975,739.—MIGRATION IMAGING SYSTEM USING SHAPED ELECTRODE. AUGUST 17, 1976.

3,976,483.—FRASING PROCESS - XDM LATENT IMAGE ERASING. AUG. 24, 1976. ARG. 0184682, AUS. 0458164, BEL. 0761130, CAN. 0946911, FRA. 7047697, GRB. 1339715, ITL. 0914071, JAP. 0770138, MEX. 0119758, VZL. 0032932.

3,979,210.—MIGRATION IMAGING MEMBER EMPLOYING A SURFACE SKIN. SEPT. 7, 1976.

3,982,936.—DEFORMATION IMAGING SYSTEM. SEPT. 28, 1976.

3,982,939.—MULTIPLE LAYER MIGRATION IMAGING SYSTEM. SEPT. 28, 1976. BEL. 0773383, CAN. 0946672, FRA. 7135575, GRB. 1370146, ITL. 0938874.

3,985,560.—IMAGING SYSTEM. OCT. 12, 1976.

4,007,042.—MIGRATION IMAGING METHOD. FEB. 8, 1977.

4,012,250.—IMAGING SYSTEM-MIGRATION IMAGE CONVERSION BY DYE TRANSFER. MAR. 15, 1977. CAN. 0972208, GRB. 1341405, JAP. 0770142.

4,014,695.—IMAGING SYSTEM. MAR. 29, 1977.

4,021,110.—PHOTOCOPYING CAMERA AND PROCESSING DEVICE. MAY 3, 1977.

4,028,101.—MIGRATION IMAGING MEMBER EMPLOYING A SURFACE SKIN. JUNE 7, 1977.

Class 31D

3,573,906.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS. APR. 6, 1971. ARG. 0177890, AUS. 0441534, BEL. 0725173, BRA. 0088092, CAN. 0906801, CZC. 0157053, FRA. 1594981, GRB. 1217726, ITL. 0852743, MEX. 0106441, SPN. 0379204, SWD. 0335063, USR. 0448658. VZL. 0029780.

3,615,400.—MIGRATION IMAGING SYSTEM EMPLOYING CARBON LAYER BETWEEN SOLVENT SOLUBLE LAYER AND CONDUCTIVE LAYER. OCT. 26, 1971. ATR. 0306509, AUS. 0433959, BEL. 0726279, CAN. 0874906, DNK. 0129015, FRA. 1598889, GRB. 1261360, ITL. 0850165, LXB. 0057703, NOR. 0127265, NZL. 0154928, SAF. 0688514, SPN. 0380191, STZ. 0512755, SWD. 7210413.

3,740,216.—PHOTOELECTROCOLOGRAPHIC IMAGING EMPLOYING A RELEASABLE IMAGING LAYER. JUNE 19, 1973.

3,740,223.—MIGRATION IMAGING STRUCTURE. JUNE 19, 1973. BRA. 6897135, CAN. 0855151, MEX. 0100800, PNM. 0002192, PRU. 0009484, VZL. 0032425.

3,753,706.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD WHEREIN AN ABSORBENT MATERIAL IS USED. AUG. 21, 1973. CAN. 0945796, GRB. 1334141, JAP. 0766711.

3,801,314.—IMAGING SYSTEM. APR. 2, 1974.

3,820,984.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD USING FUSIBLE PARTICLES. JUNE 28, 1974.

3,836,364.—PHOTOELECTROSOLOGRAPHIC PROCESS FOR MAKING MULTIPLE IMAGES. SEPT. 17, 1974. CAN. 0914519, GRB. 1344482, JAP. 0770140.

3,839,031.—ELECTRODE DEVELOPMENT MIGRATION IMAGING METHOD. OCT. 1, 1974. ARG. 0184241, AUS. 0456843. BEL. 0755599, CAN. 0947367, FRA. 7032000, GRB. 1326950, ITL. 0907387, JAP. 0766709, MEX. 0120156, SPN. 0383314, SWD. 0369115.

3,873,309.—IMAGING METHOD USING MIGRATION MATERIAL. MAR. 25, 1975. CAN. 978008, GRB. 1357143.

3,901,702.—MIGRATION IMAGING ELEMENT WITH ABSORBENT BLOTTER OVERLAYER. AUG. 26, 1975. CAN. 0945796, GRB. 1334141, JAP. 0766711.

3,933,491.—IMAGING SYSTEM. JAN. 20, 1976.

3,966,465.—MULTIPLE LAYER MIGRATION IMAGING SYSTEM. JUNE 29, 1976. BEL. 0773383, CAN. 0960286, FRA. 7135575, GRB. 1370146, ITL. 0938874.

3,975,195.—MIGRATION IMAGING SYSTEM. AUG. 17, 1976.

3,982,939.—MULTIPLE LAYER MIGRATION IMAGING SYSTEM. SEPT. 28, 1976. BEL. 0773383, CAN. 0946672, FRA. 7135575, GRB. 1370146, ITL. 0938874.

3,985,560.—IMAGING SYSTEM. OCT. 12, 1976.

3,998,635.—IMAGING SYSTEM. DEC. 21, 1976.

4,007,042.—MIGRATION IMAGING METHOD. FEB. 8, 1977.

4,009,028.—REVERSE MIGRATION IMAGING SYSTEM. FEB. 22, 1977. BEL. 0827065.

4,012,250.—IMAGING SYSTEM-MIGRATION IMAGE CONVERSION BY DYE TRANSFER. MAR. 15, 1977. CAN. 0972208, GRB. 1341405, JAP. 0770142.
4,013,462.—MIGRATION IMAGING SYSTEM. MAR. 22, 1977.

Class 31E

3,598,644.—IMAGING MEMBER FABRICATION. AUG. 10, 1971.
3,671,282.—METHOD OF MAKING AN IMAGING MEMBER. JUNE 20, 1972. BEL. 0755384, FRA. 7031999, GRB. 1326056, ITL. 0901735.
3,971,334.—COATING DEVICE. JULY 27, 1976.
4,009,028.—REVERSE MIGRATION IMAGING SYSTEM. FEB. 22, 1977. BEL. 0827065.

Class 31F

3,520,681.—PHOTOELECTROSOLOGRAPHY. JULY 14, 1970. BRA. 0084241, CAN. 0852692, MEX. 0085656.
3,780,307.—LIQUID CRYSTALLINE COMPOSITIONS HAVING INDUCED OPTICAL ACTIVITY. DEC. 18, 1973. CAN. 1000484, GRB. 1408059.
3,909,262.—IMAGING MIGRATION MEMBER EMPLOYING A GELATIN OVERCOATING. SEPT. 30, 1975.
3,933,491.—IMAGING SYSTEM. JAN. 20, 1976.
3,966,465.—MULTIPLE LAYER MIGRATION IMAGING SYSTEM. JUNE 29, 1976. BEL. 0773383, CAN. 0960286, FRA. 7135575, GRB. 1370146, ITL. 0938874.

Class 31G

3,664,834.—MIGRATION IMAGING METHOD EMPLOYING ADHESIVE TRANSFER MEMBER. MAY 23, 1972. CAN. 0890353, GER. 1964201, GRB. 1291848, JAP. 0726370.
3,723,113.—POLYCHROMATIC ELECTROSOLOGRAPHIC. MAR. 27, 1973.
3,740,216.—PHOTOELECTROCOLOGRAPHIC IMAGING EMPLOYING A RELEASABLE IMAGING LAYER. JUNE 19, 1973.
3,741,757.—MIGRATION IMAGE DEVELOPMENT BY SPLITTING OR ABRADING SOFTENABLE LAYER. JUNE 26, 1973. ATR. 0306510, AUS. 0441768, BEL. 0743209, CAN. 0915960, FRA. 6943268, GER. 1961754, GRB. 1297129, ITL. 0879120, JAP. 0725058, PNM. 0001554, SPN. 0374618, SWD. 0358750, VZL. 0032779.
3,741,758.—MIGRATION IMAGING EMPLOYING PRESSURE NIP DEVELOPMENT. JUNE 26, 1973.
3,753,706.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD WHEREIN AN ABSORBENT MATERIAL IS USED. AUG. 21, 1973. CAN. 0945796, GRB. 1334141. JAP. 0766711.
3,770,554.—APPARATUS FOR SPLITTING A SOFTENABLE FILM COMPRISING BITE ROLLERS. NOV. 6, 1973.
3,791,822.—REMOVAL OF BACKGROUND FROM AN IMAGED MIGRATION LAYER. FEB. 12, 1974. ATR. 0306510, AUS. 0441768, BEL. 0743209, CAN. 0915960, FRA. 6943268, GER. 1961754, GRB. 1297129, ITL. 0879120, JAP. 0725058, PNM. 0001554, SPN. 0374618, SWD. 0358750, VZL. 0032779.
3,836,364.—PHOTOELECTROSOLOGRAPHIC PROCESS FOR MAKING MULTIPLE IMAGES. SEPT. 17, 1974. CAN. 0914519, GRB. 1344482, JAP. 0770140.
3,876,445.—MIGRATION IMAGING BY SPLITTING A SOFTENABLE MATERIAL. APR. 8, 1975. ATR. 0306510, AUS. 0441768, BEL. 0743209, CAN. 0915960, FRA. 6943268, GER. 1961754, GRB. 1297129, ITL. 0879120, JAP. 0725058, PNM. 0001554, SPN. 0374618, SWD. 0358750, VZL. 0032779.
3,979,210.—MIGRATION IMAGING MEMBER EMPLOYING A SURFACE SKIN. SEPT. 7, 1976.
4,014,695.—IMAGING SYSTEM. MAR. 29, 1977.
4,028,101.—MIGRATION IMAGING MEMBER EMPLOYING A SURFACE SKIN. JUNE 7, 1977.

Class 31H

3,795,512.—IMAGING SYSTEM. MAR. 5, 1974. ARG. 0188187, ATR. 0301340, AUS. 0429441, BEL. 0725617, BRA. 0088091, CAN. 0883747, DNK. 0131212, FRA. 1599277. GER. 1815217, GRB. 1257189, ITL. 0849328, JAP. 0686721, LXB. 0057585, MEX. 0101986, NOR. 0128084, NZL. 0154842, PTG. 0050858, SAF. 0688365, SPN. 0361650, STZ. 0523523, SWD. 0341128, VZL. 0023715.
3,839,031.—ELECTRODE DEVELOPMENT MIGRATION IMAGING METHOD. OCT. 1, 1974. ARG. 0184241, AUS. 0456843, BEL. 0755599, CAN. 0947367, FRA. 7032000, GRB. 1326950, ITL. 0907387, JAP. 0766709, MEX. 0120156, SPN. 0383314, SWD. 0369115.

Class 31I

3,861,911.—IMAGING FIXING METHOD. JAN. 21, 1975.

Class 31J

3,648,607.—IMAGING SYSTEM-MASTER MAKING BY BINDER PESO. MAR. 14, 1972. CAN. 0920410, GRB. 1322946, JAP. 0770136.
3,664,834.—MIGRATION IMAGING METHOD EMPLOYING ADHESIVE TRANSFER MEMBER. MAY 23, 1972. CAN. 0890353, GER. 1964201, GRB. 1291848, JAP. 0726370.
3,723,113.—POLYCHROMATIC ELECTROSOLOGRAPHIC. MAR. 27, 1973.
3,740,216.—PHOTOELECTROCOLOGRAPHIC IMAGING EMPLOYING A RELEASABLE IMAGING LAYER. JUNE 19, 1973.
3,820,984.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD USING FUSIBLE PARTICLES. JUNE 28, 1974.
3,923,504.—MIGRATION IMAGING MEMBER AND METHOD. DEC. 2, 1975.
3,985,560.—IMAGING SYSTEM. OCT. 12, 1976.

Class 31K

3,873,309.—IMAGING METHOD USING MIGRATION MATERIAL. MAR. 25, 1975. CAN. 978008, GRB. 1357143.
3,894,869.—A POLYCHROMATIC MIGRATION IMAGING SYSTEM. JULY 15, 1975.
3,912,505.—COLOR IMAGING METHOD EMPLOYING A MONOLAYER OF BEADS. OCT. 14, 1975. ARG. 0179561, AUS. 0426600, BEL. 0723097, CAN. 0890354, CHL. 0024276, FRA. 1587252, GRB. 1248744, GUA. 0002327, HOL. 0151526, ITL. 0845607, JAP. 0731223, MEX. 0107801, PNM. 0001814, PRU. 0010425, SPN. 0377583, STZ. 0526138, SWD. 0351501, URG. 0009366, VZL. 0023708.
3,966,465.—MULTIPLE LAYER MIGRATION IMAGING SYSTEM. JUNE 29, 1976. BEL. 0773383, CAN. 0960286, FRA. 7135575, GRB. 1370146, ITL. 0938874.
4,012,250.—IMAGING SYSTEM-MIGRATION IMAGE CONVERSION BY DYE TRANSFER. MAR. 15, 1977. CAN. 0972208, GRB. 1431405, JAP. 0770142.

Class 31L

3,615,394.—METHOD OF FORMING A PIGMENT IMAGE FROM A PIGMENT-RESIN TONER IMAGE. OCT. 26, 1971.
3,615,400.—MIGRATION IMAGING SYSTEM EMPLOYING CARBON LAYER BETWEEN SOLVENT SOLUBLE LAYER AND CONDUCTIVE LAYER. OCT. 26, 1971. ATR. 0306509, AUS. 0433959, BEL. 0726279, CAN. 0874906, DNK. 0129015, FRA. 1598889, GRB. 1261360. ITL. 0850165, LXB. 0057703, NOR. 0127265, NZL. 0154928, SAF. 0688514, SPN. 0380191, STZ. 0512755, SWD. 7210413.
4,012,250.—IMAGING SYSTEM-MIGRATION IMAGE CONVERSION BY DYE TRANSFER. MAR. 15, 1977. CAN. 0972208, GRB. 1431405, JAP. 0770142.

Class 32

3,719,951.—WRAP ADJUST DEVICE FOR CONTROLLING ENGAGEMENT BETWEEN A WEB AND ROLLER IN AN IMAGING SYSTEM. MAR. 6, 1973. CAN. 0995295, GRB. 1406047.
3,746,622.—COMPOSITION AND PROCESS. JULY 17, 1973. BEL. 0783439, CAN. 0986046, FRA. 7216331, MEX. 0132353, GRB. 1388725, ITL. 0965051, SAF. 7213163, STZ. 0590297.
3,774,592.—METHOD FOR PROVIDING AN IMPROVED BODY ELECTRODE ELECTRICAL CONNECTION. NOV. 27, 1973.
3,884,685.—LOW DENSITY PAPER USED IN TRANSFER ELECTROPHOTOGRAPHY. MAY 20, 1975. ARG. 0185573, ATR. 0314353, AUS. 0463544, BEL. 0768990, CAN. 9780051, CHL. 0027015, FRA. 7124553, GRB. 1353372, ITL. 0931092, MEX. 0124810, NOR. 0134805, NZL. 0164088, PNM. 0002462, SPN. 0392720, SWD. 0368995.
3,891,990.—IMAGING PROCESS USING DONOR MATERIAL. JUNE 24, 1975. GRB. 1459468.
3,946,172.—A LATCHING APPARATUS. MAR. 23, 1976. GRB. 1429530.
3,946,401.—ELECTROTHERMOGRAPHIC IMAGE PRODUCING TECHNIQUES. MAR. 23, 1976.
3,952,798.—INTERNALLY HEATED HEAT PIPE ROLLER-INTERNALLY HEATED HEAT PIPE. APR. 27, 1976. CAN. 0968341. GRB. 1368100.

3,971,950.—INDEPENDENT COMPRESSION AND POSITIONING DEVICE FOR USE IN MAMMOGRAPHY. JULY 27, 1976.
3,975,681.—ELECTRODE FOR MEASURING THICKNESS OF DIELECTRIC LAYERS ON CONDUCTIVE SUBSTRATES. AUG. 17, 1976.
3,978,342.—DUAL MODE RADIATION TRANSMITTING APPARATUS. AUG. 31, 1976.
3,997,498.—NON-SMUDGE CORRECTION FLUID. DEC. 14, 1976.
4,010,366.—MEASUREMENT OF THE MASS & CHARGE OF CHARGED CIRCUITS. MAR. 1, 1977.
4,018,953.—COATING METHOD. APR. 19, 1977.
4,020,210.—ENCAPSULATED WATER. APR. 26, 1977.
4,020,268.—AGAROSE CONTAINING AFFINITY MATRIX MATERIALS. APR. 26, 1977. BEL. 0783439, CAN. 0986046, FRA. 7216331, GRB. 1388725, ITL. 0965051, MEX. 0132353, SAF. 7213163, STZ. 0590297.

Class 32A

3,132,972.—ENERGY CONVERSION CELL. MAY 12, 1964.
3,231,426.—CONTINUOUS CONCENTRATION CELL. JAN. 25, 1966.
3,379,527.—PHOTOCONDUCTIVE INSULATORS COMPRISING ACTIVATED SULFIDES SELENIDES AND SULFOSELENIDES OF CADMIUM. APR. 23, 1968. CAN. 0907921, GRB. 1079065.

Class 32B

3,150,446.—BRAZING METHOD AND COMPOSITION. SEPT. 29, 1964.
3,354,644.—LIQUID PROTECTION OF ELECTRODES. NOV. 28, 1967.
3,372,860.—CORRESPONDENCE PIECE. MAR. 12, 1968.
3,453,752.—ANSWER COMPARISON DEVICE. JULY 8, 1969.
3,483,777.—INFORMATION STORAGE AND RETRIEVAL EMPLOYING THERMAL PERFORATION OF THE RECORD MEMBER. DEC. 16, 1969. CAN. 0811566.
3,507,333.—FIRE PREVENTION SYSTEM. APR. 21, 1970. BEL. 0722599, CAN. 0910255, FRA. 1589864, GRB. 1229495, ITL. 0845253, JAP. 0752504.
3,510,210.—COMPUTER PROCESS CHARACTER ANIMATION. MAY 5, 1970.
3,552,562.—RANDOM ACCESS RETRIEVAL SYSTEM. JAN. 5, 1971.
3,577,203.—CHARACTER RECORDING AND RECOGNITION SYS. MAY 4, 1971.
3,635,789.—DRINKING OF WASTE XEROGRAPHIC COPY PAPER - REMOVAL OF XEROX TONER FROM COPY PAPER. JAN. 18, 1972.
3,645,048.—ERASER FOR VELLUM XEROGRAPHIC COPY PAPER. FEB. 29, 1972. AUS. 0449216, CAN. 0933707, GRB. 1329835.
3,647,713.—NONAGGLOMERATING BLENDING PROCESS. MAR. 7, 1972. FRA. 7004722, GRB. 1302409, JAP. 0661186.
3,648,387.—EDUCATIONAL AID. MAR. 14, 1972.
3,655,379.—PRINTING BY VAPOR PROPULSION. APR. 11, 1972. BEL. 0758057, CAN. 0929351, FRA. 7041621, GRB. 1333783, ITL. 0916693.
3,708,287.—OIL FILM IMAGING. JAN. 2, 1973.
3,713,861.—INHIBITOR DEVICE. JAN. 30, 1973. CAN. 0917701, GRB. 1338893, JAP. 0727989.
3,748,090.—EVAPORATION CRUCIBLE. JULY 24, 1973.
3,771,084.—MAGNETIC RETRIEVAL DEVICE. NOV. 6, 1973.
3,772,173.—ELECTROCONDUCTIVE PAPER. NOV. 13, 1973. CAN. 0930693.
3,793,016.—ELECTROPHOTOGRAPHIC SHEET BINDING PROCESS. FEB. 19, 1974.
3,794,550.—SHEET BINDING. FEB. 26, 1974. CAN. 1012583, GRB. 1431286.
3,812,905.—DYNAMIC BARRIER FOR HEAT PIPE. MAY 28, 1974.
3,842,273.—CORONA GENERATOR CLEANING APPARATUS. OCT. 15, 1974. AUS. 0480142, BEL. 0817485. GRB. 1458088, SPN. 0428358.
3,845,739.—SYSTEM FOR VAPOR DEPOSITION OF THIN FILMS. NOV. 5, 1974. BEL. 0798324, GRB. 1428703.
3,861,202.—METHOD OF DETECTING PRESSURE UNIFORMITY. JAN. 21, 1975.
3,861,353.—SYSTEM FOR VAPOR DEPOSITION OF THIN FILMS. JAN. 21, 1975. BEL. 0798324, GRB. 1428703.
3,862,841.—POLYMERIZATION IMAGING BY CHARGE INJECTION FROM A PHOTOCONDUCTIVE LAYER. JAN. 28, 1975.
3,869,910.—DIAGNOSTIC TEST DEVICE FOR DEVELOPER MATERIALS. MAR. 11, 1975. CAN. 1006012, FRA. 7421111.
3,873,813.—CREDIT CARD. MAR. 25, 1975.
3,877,155.—RESPONSIVE ANSWER SYSTEM. APR. 15, 1975. CAN. 0858780, GRB. 1235941, JAP. 0688426.
3,879,275.—POLYMERIZATION. APR. 22, 1975.
3,901,591.—MECHANISM FOR COOLING PHOTOSENSITIVE MATERIALS IN AN ELECTROPHOTOGRAPHIC COPYING MACHINE. AUG. 26, 1975.
3,918,337.—CUTTING DEVICE FOR ELASTOMERIC SHEET MATERIAL. NOV. 11, 1975.
3,921,179.—FLUID PEN ASSEMBLY. NOV. 18, 1975.
3,921,896.—RESEALABLE CONTAINER. NOV. 25, 1975.
3,923,512.—IMAGING RECORDING PROCESS. DEC. 2, 1975. CAN. 1007097, GRB. 1387177.
3,929,477.—IMAGE PRODUCING TECHNIQUES OF SUPERCONDUCTING MATERIAL IN A MAGNETIC FIELD. DEC. 30, 1975.
3,944,710.—TRANSPARENCY. MAR. 16, 1976.
3,949,853.—PROPORTIONAL-SPACED CHARACTER PRINT WHEEL. APR. 13, 1976. BEL. 0825109, CAN. 1011276, GER. 7502932, STZ. 579989.
3,965,276.—POLYMERIZATION IMAGING. JUNE 22, 1976.
3,966,467.—TRANSFERRING TONER TO AN HYDROCARBON COATED SHEET. JUNE 29, 1976.
3,969,618.—ON LINE PROM HANDLING SYSTEM. JULY 13, 1976.
3,970,186.—DAMPER FOR A COMPOSITE PRINT WHEEL. JULY 20, 1976. BEL. 0825110, CAN. 1010805, STZ. 579990.
3,974,363.—PROGRAMMABLE BILLING SYSTEM. AUG. 10, 1976. BEL. 0813449, FRA. 7412151, GRB. 1448508, ITL. 1007793.
3,978,737.—CHAIN TENSIONING DEVICE. SEPT. 7, 1976.
3,989,865.—A TRANSPARENCY. NOV. 2, 1976.
3,992,511.—RECOVERY OF SELENIUM-SELENIUM RECOVERY PROCESS. NOV. 16, 1976.
4,000,460.—DIGITAL CIRCUIT MODULE TEST SYSTEM. DEC. 28, 1976.
4,013,362.—ADJUSTABLE FORMS GUIDE. MAR. 22, 1977.
4,037,706.—COMPOSITE PRINT WHEEL. JULY 26, 1977. BEL. 0825108, CAN. 1010806.

PATENT NOTICES

Certificates of Correction for the Week of Nov. 22, 1977

P.P. 4,039	4,022,740	4,036,394	4,041,004
P.P. 4,040	4,022,748	4,036,396	4,041,009
Re. 29,390	4,023,004	4,036,430	4,041,567
D. 243,443	4,023,671	4,036,564	4,041,580
D. 243,661	4,023,982	4,036,751	4,041,591
D. 244,556	4,024,228	4,036,786	4,041,612
D. 244,609	4,024,498	4,036,789	4,041,746
D. 244,789	4,024,872	4,036,829	4,041,752
D. 244,864	4,025,144	4,036,935	4,041,822
D. 244,912	4,025,356	4,037,027	4,042,002
D. 244,958	4,025,484	4,037,053	4,042,096
3,616,114	4,025,504	4,037,080	4,042,317
3,728,400	4,025,730	4,037,092	4,042,326
3,856,521	4,025,830	4,037,117	4,042,484
3,882,188	4,026,440	4,037,151	4,042,623
3,893,013	4,026,742	4,037,154	4,042,706
3,896,156	4,026,853	4,037,193	4,042,750
3,900,564	4,026,946	4,037,252	4,042,961
3,923,808	4,027,065	4,037,265	4,042,986
3,940,295	4,027,403	4,037,670	4,043,058
3,946,021	4,027,594	4,037,840	4,043,094
3,953,382	4,028,598	4,037,868	4,043,265
3,955,032	4,029,552	4,038,063	4,043,419
3,961,916	4,029,741	4,038,103	4,043,473
3,962,073	4,030,747	4,038,162	4,043,597
3,965,939	4,031,348	4,038,210	4,043,662
3,967,283	4,031,761	4,038,271	4,043,715
3,983,305	4,031,798	4,038,274	4,043,889
3,985,730	4,031,960	4,038,374	4,043,930
3,993,061	4,031,993	4,038,427	4,043,933
3,996,912	4,032,368	4,038,482	4,043,944
3,997,017	4,032,466	4,038,503	4,043,983
3,997,100	4,032,615	4,038,532	4,043,997
3,997,399	4,032,744	4,038,711	4,044,064
3,997,474	4,033,026	4,038,751	4,044,222
4,001,996	4,033,379	4,038,775	4,044,226
4,004,140	4,033,403	4,039,260	4,044,246
4,005,755	4,033,495	4,039,299	4,044,309
4,005,995	4,033,767	4,039,301	4,044,440
4,008,334	4,033,915	4,039,472	4,044,458
4,008,680	4,034,052	4,039,477	4,044,812
4,009,071	4,034,110	4,039,543	4,044,870
4,009,574	4,034,117	4,039,562	4,045,098
4,010,400	4,034,341	4,039,668	4,045,146
4,014,535	4,034,560	4,039,743	4,045,188
4,015,319	4,034,865	4,039,818	4,045,597
4,016,211	4,035,190	4,039,944	4,045,612
4,017,284	4,035,303	4,039,950	4,045,788
4,018,191	4,035,320	4,039,955	4,046,061
4,019,336	4,035,357	4,039,967	4,046,077
4,019,689	4,035,416	4,040,027	4,046,107
4,019,904	4,035,656	4,040,124	4,046,549
4,020,223	4,035,725	4,040,166	4,046,556
4,020,364	4,035,735	4,040,177	4,046,709
4,020,939	4,035,812	4,040,221	4,046,758
4,021,266	4,035,956	4,040,363	4,046,802
4,021,407	4,035,994	4,040,510	4,047,062
4,021,542	4,036,151	4,040,527	
4,021,920	4,036,159	4,040,585	
4,022,215	4,036,374	4,040,655	

Manual Subscriptions and Rule and Statute Booklets

All subscriptions to various manuals and rules and the sale of various individual booklets which emanate from the Patent and Trademark Office, are handled by the Government Printing Office. Orders for new subscriptions or for the purchase of individual booklets should be addressed to the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Inquiries concerning subscriptions previously placed or concerning revision material issued under a subscription should be addressed to the Superintendent of Documents, U.S. Government Printing Office, Customer Service Section SSOS, Washington, D.C. 20402.

However, as a service to patent and trademark practitioners and other interested parties, the following information is being published regarding revision schedules and rates for manual subscriptions, and rule and statute booklets. This information should be helpful in determining the currency of manuals and rules.

The Manual of Patent Examining Procedure (M.P.E.P.) is revised quarterly, the revisions being numbered consecutively and dated January, April, July and October of each year. The current subscription price for the M.P.E.P. is $19.65 (plus $4.95 for foreign mailing).

Revisions of the Manual of Classification for patents are presently published irregularly. However, beginning in 1978 it will be revised on a regular basis. These revisions will be published quarterly, dated January, April, July and October. The current subscription price for this manual is $44.00 (plus $11.00 for foreign mailing).

The Trademark Manual of Examining Procedure is normally revised anually, the revisions being numbered consecutively and dated January of each year. The current subscription price for the T.M.E.P. is $8.10 (plus $2.05 for foreign mailing).

The Trademark Rules of Practice (including the trademark statute) is revised from time to time whenever changes are made in the rules or the statute. The current Trademark Rules of Practice is the Ninth Edition, dated December 1976, and the current subscription price is $5.00 (plus $1.25 for foreign mailing).

The foregoing publications are available only by subscription. When revisions are issued, they are a part of the subscription and are mailed to subscribers automatically by the Superintendent of Documents of the Government Printing Office without additional charge. The original subscription price covers revisions until the Government Printing Office mails a notice of expiration of the subscription with a statement of the renewal fee necessary for continuing the subscription to the subscriber.

Both the patent rules and trademark rules are contained in an annual publication entitled 37 Code of Federal Regulations which is revised July 1 of each year. The price for the 1977 edition is $3.00 per copy.

The Patent Laws booklet is revised on an as-needed basis. The current edition is dated August 1976 and the current price is $2.10.

Due to the requirements of the printing process, these publications and revisions are generally not available until several months after the date which is printed on the revision or the booklet.

Date Oct. 12, 1977. LUTRELLE F. PARKER,
Acting Commissioner of Patents and Trademarks.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF OCTOBER 8, 1977

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	6-22-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	1-3-77
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	2-1-77
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	10-22-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	10-27-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	8-18-76
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	6-15-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	1-7-77
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	10-12-76
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	7-9-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	3-24-76
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	9-1-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	3-17-77
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	11-1-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	11-1-76
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	2-3-77

Expiration of patents: The patents within the range of numbers indicated below expire during October 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,954,560 to 2,958,080, inclusive
Plant Patents..... Numbers 1,974 to 1,977, inclusive

REISSUES

NOVEMBER 22, 1977

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 29,476

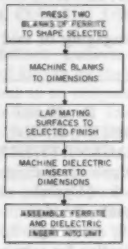
METHOD FOR FABRICATING A DIELECTRIC FILLED FERRITE TOROID FOR USE IN MICROWAVE DEVICES

Frank R. Monforte, Los Altos, and Giltan M. Argentina, San Jose, both of Calif., assignors to Ampex Corporation, Redwood City, Calif.

Original No. 4,007,541, dated Feb. 15, 1977, Ser. No. 567,757, Apr. 14, 1975. Application for reissue Apr. 8, 1977, Ser. No. 785,898

Int. Cl.[2] H01P *11/00*; H01F *41/02*

U.S. Cl. 29—600 **9 Claims**


PRESS TWO BLANKS OF FERRITE TO SHAPE SELECTED
MACHINE BLANKS TO DIMENSIONS
LAP MATING SURFACES TO SELECTED FINISH
MACHINE DIELECTRIC INSERT TO DIMENSIONS
ASSEMBLE FERRITE AND DIELECTRIC INSERT INTO UNIT

1. A method for fabricating a two-piece toroid having a dielectric material insert, which two-piece toroid exhibits the hystersis loop characteristics of a one-piece toroid, comprising the steps of:

pressing selected quantities of a magnetic material into a pair of selected complementary blanks of substantially uniform density over their entire cross-sections;

machining the pair of blanks to define confronting mating surfaces commensurate with complementary cross-sectional shapes and lengths of given dimensions within selected tolerances;

lapping the confronting mating surfaces of the pair of machined shapes to a finish sufficient to maintain the hystersis loop characteristics inherent in a similar one-piece configuration formed of the same magnetic material;

machining a single dielectric material insert to outside dimensions which allow the insert to fit snugly within the complementary pair of magnetic machined shapes along the entire length thereof; and

assembling the complementary pair of machined shapes about the dielectric material insert with intimate contact between all surfaces of the insert facing respective confronting surfaces of the machined shapes, wherein the lapped confronting surfaces of the machined shapes are in such intimate contact that the hysteresis loop characteristics are similar to those of a one-piece toroid.

Re. 29,477

FOOD PRODUCT FREEZING APPARATUS

Edward M. Wight, Austin, Tex., assignor to Glacier Industries, Inc., Austin, Tex.

Original No. 3,857,252, dated Dec. 31, 1974, Ser. No. 324,432, Jan. 17, 1973. Application for reissue Jan. 13, 1977, Ser. No. 759,051

Int. Cl.[2] F25D *23/02*

U.S. Cl. 62—266 **32 Claims**

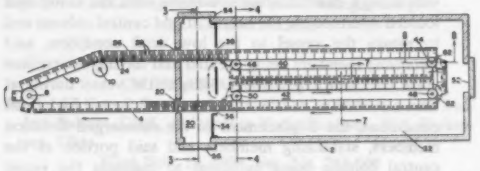
1. A food freezing apparatus comprising:

a vault;

a continuous conveying means for transporting food products into, through and out of said vault, said conveying means traveling primarily in at least one network along *vertical* substantially parallel planes within said vault;

a refrigeration coil;

means for circulating air in heat exchange with said coil and over said products in a direction substantially parallel to a plane perpendicular to the primary planes of travel of said conveying means within said vault; and a bulkhead within



said vault forming a first and second chamber within said vault, said food products passing into and out of said vault through said first chamber, said second chamber containing said means for circulating air, said coil and said networks, wherein said bulkhead is positioned substantially perpendicular to the primary planes of travel of said conveying means and parallel to said air circulation direction.

Re. 29,478

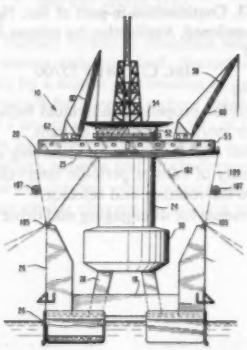
SINGLE COLUMN SEMISUBMERSIBLE DRILLING VESSEL

Yoram Goren, Los Angeles, Calif., and Samuel H. Lloyd, III, Houston, Tex., assignors to Santa Fe International Corporation, Orange, Calif.

Original No. 3,771,481, dated Nov. 13, 1973, Ser. No. 139,765, May 3, 1971. Application for reissue Nov. 10, 1975, Ser. No. 630,752

Int. Cl.[2] B63B *35/44*

U.S. Cl. 114—265 **45 Claims**



1. A variable draft vessel comprising:

a pair of elongated flotation members disposed in spaced side-by-side substantially parallel relation one to the other, said flotation members having a combined displacement sufficient to float the vessel in a low draft condition with the flotation members having freeboard and constituting substantially the entirety of the flotational support for said vessel in said low draft condition;

a working platform;

means connected between said working platform and said flotation members to support said working platform in fixed spaced relation above said flotation members;

a plurality of elements carried by said vessel between said flotation members and said platform with at least one of said elements comprising at least part of said connecting means;

said elements including a central, substantially vertically disposed, column *located substantially at the vessel's central vertical axis* and a plurality of stabilizing members spaced laterally outwardly of said central column and one from the other;

the upper portions of said stabilizing members being spaced below said platform;

means for ballasting and deballasting the vessel to respectively submerge the flotation members, stabilizing members and a portion of said central column thereby to provide a high draft floating condition with the water line located intermediate the height of said central column and to return the vessel to the low draft condition, said *stabilizing* members being located and having waterplane areas sufficient to provide stability to the vessel during at least a portion of its transition between low and high draft conditions, the displacement of the submerged flotation members, stabilizing members and said portion of the central column being sufficient to maintain the vessel buoyant in the high draft condition;

the vertical spacing between said platform and said flotation members being identical in both said high and low draft conditions of said vessel; and

means carried by said platform for conducting drilling operations external to said vessel when said vessel lies in said high draft floating condition.

Re. 29,479

TENNIS BALL PITCHING APPARATUS WITH ANTI-JAMMING BALL FEED MECHANISM

Joseph J. Mohr, 1200 Cardiff Drive, Encinitas, Calif. 92024

Original No. 3,844,267, dated Oct. 29, 1974, Ser. No. 357,907, May 7, 1973. Continuation-in-part of Ser. No. 133,070, April 12, 1971, abandoned. Application for reissue Aug. 5, 1976, Ser. No. 712,097

Int. Cl.[2] F41B *15/00*

U.S. Cl. 124—1 **7 Claims**

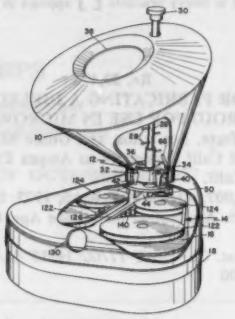
5. Apparatus for propelling individual balls comprising:

a hopper for storing a quantity of balls,

a rotating ball selector means for removing a single ball from said quantity of balls at periodic intervals,

drive means for rotating said selector,

and clutch means for disengaging said drive means from said ball selector means at a pre-determined torque, and for subsequently imparting a reverse rotation to said selector means and a re-engaging of said drive means with said selector means.



Re. 29,480

METHOD FOR DETERMINING VITAMIN B_{12} AND REAGENT THEREFOR

Rolf E. A. V. Axen, Upplands Bälinge; Jerker O. Porath, and Leif Edvin Wide, both of Uppsala, all of Sweden, assignors to Pharmacia AB, Uppsala, Sweden

Original No. 3,505,019, dated Apr. 7, 1970, Ser. No. 675,323, Oct. 16, 1967. Application for reissue July 23, 1975, Ser. No. 598,142

Claims priority, application Sweden, Oct. 21, 1966, 14397/66

Int. Cl.[2] G01N *23/00, 33/16;* G01T *1/16*

U.S. Cl. 424—1.5 **31 Claims**

1. A method for determining vitamin B_{12} in an aqueous sample, which comprises contacting particles of water-insoluble polymers to which a substance capable of binding vitamin B_{12} has been bound, by covalent bonds, with the sample and with a certain amount of vitamin B_{12} labelled with a radioisotope, and subsequent to the reaction between vitamin B_{12} and the substance capable of binding vitamin B_{12} attached to the particles having taken place, separating the particles from the sample liquid and determining the radioactivity of the particle material.

17. A method according to claim 1, wherein said covalent bonds are formed through a group of the formula —NH·CS·NH—, —NH·CO·NH—, or —N=N—.

22. A method according to claim 1, wherein said polymer is obtained by cross-linking a material selected from the group consisting of carbohydrates, sugar alcohols, and polyvinyl alcohol, with a bifunctional compound of the formula X—R—Z, wherein X and Z are each independently halogen or epoxy, and R is an aliphatic radical containing from 3 to 10 carbon atoms.

PLANT PATENTS

GRANTED NOVEMBER 22, 1977

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,153
CHRYSANTHEMUM PLANT

Walter H. Jessel, Jr., Grantsville, W. Va., and William E. Duffett, Salinas, Calif., assignors to Yoder Brothers, Inc., Barberton, Ohio

Filed Aug. 23, 1976, Ser. No. 716,440
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—74 **1 Claim**

1. A new and distinct cultivar of *Chrysanthemum morifolium,* Ramat., plant known by the cultivar name Joy and particularly characterized as to uniqueness by the combined characteristics of flat inflorescence form; anenome inflorescence type; medium yellow ray floret color, tinging light bronze with cool (below 60° F) finishes; minimal inflorescence color oxidation during high temperature periods; uniform 8 week flowering response to photoperiodic short-day control; short plant height; semi-upright branching pattern; and diameter across face of inflorescence up to 95 mm. at maturity.

4,154
AFRICAN VIOLET PLANT

Hermann Holtkamp, Sr., Kueningsmuehle, 2-Dingden, 4236 Hamminkeln, Germany

Filed Oct. 7, 1976, Ser. No. 730,356
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—69 **1 Claim**

1. A new and distinct cultivar of African Violet plant referred to by the cultivar name Evelyn and particularly characterized as to uniqueness by the combined characteristics of violet-blue flower color, relatively large flower size on strong stems, profuse flowering and long blooming period, foliage color, and fast and vigorous growth.

4,155
NECTARINE TREE

Chris Floyd Zaiger, 537 Rosemore Ave., Modesto, Calif. 95351

Filed Oct. 12, 1976, Ser. No. 731,557
Int. Cl.[2] A01H *5/03*
U.S. Cl. Plt.—41 **1 Claim**

1. A new and distinct variety of nectarine tree, characterized by its dwarf size and heavy production, bearing medium size, highly colored, clingstone fruit of good eating quality.

4,156
CHRYSANTHEMUM PLANT

Walter H. Jessel, Jr., Grantsville, W. Va., and William E. Duffett, Salinas, Calif., assignors to Yoder Brothers, Inc., Barberton, Ohio

Filed Nov. 18, 1976, Ser. No. 743,060
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—74 **1 Claim**

1. A new and distinct cultivar of *Chrysanthemum morifolium,* Ramat., plant known by the cultivar name Jamboree and particularly characterized as to uniqueness by the combined characteristics of spooned daisy inflorescence type; flat inflorescence form; orange-bronze to yellow-bronze ray floret color; medium green disc floret color at immature, unopened state; diameter across face of inflorescence up to 110 mm. at maturity; uniform nine week photoperiodic flowering response to short day control; medium plant height; semi-upright branching pattern, and minimal pollen development.

4,157
MOUNTAIN ASH TREE

John Frank Schmidt, Jr., 19343 NE. Halsey St., Portland, Oreg. 97230

Filed Dec. 27, 1976, Ser. No. 754,521
Int. Cl.[2] A01H *5/12*
U.S. Cl. Plt.—51 **1 Claim**

1. A new and distinct variety of mountain ash tree substantially as herein shown and described, characterized particularly as to novelty by a unique combination of its rapid rate of growth, a trunk which for a tree of a given height is straighter than the trunk of a tree of an ordinary variety of similar height, large foliage with dark green leaflets, a large proportion of the surface area of young petioles and newly formed branches is reddish color, and fall changes which occur approximately 2 to 3 weeks later than similar changes in ordinary varieties.

PATENTS

GRANTED NOVEMBER 22, 1977

ERRATA

For CLASS	See PATENT NO.
128–022.05	4,059,169
356–222	4,059,359
062–049	4,059,424
264–046.4	4,059,564
542–426	4,059,577
544–021	4,059,578
544–172	4,059,579
544–073	4,059,580
544–069	4,059,581
544–193	4,059,610
560–026	4,059,613
560–053	4,059,614
560–132	4,059,615
560–066	4,059,616
560–222	4,059,617
560–221	4,059,618
364–108	4,059,745
364–107	4,059,746
364–493	4,059,747
235–303.1	4,059,748
235–302	4,059,749
364–715	4,059,750
364–829	4,059,751
362–098	4,059,752
362–267	4,059,753
362–217	4,059,754
362–224	4,059,755
363–037	4,059,791
363–135	4,059,792
365–104	4,059,826
365–126	4,059,827
365–032	4,059,828
365–019	4,059,829
343–006.8 R	4,059,831

SHIRT

Louis A

U.S. Cl.

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PATENTS

GRANTED NOVEMBER 22, 1977

GENERAL AND MECHANICAL

4,058,852

SHIRT TYPE GARMENT INCLUDING BUILT IN ARM POSITIONING MEANS

Louis Aragona, 11 Schelber Terrace, Cedar Grove, N.J. 07009

Filed Aug. 31, 1976, Ser. No. 719,198

Int. Cl.[2] A41B *1/00*

U.S. Cl. 2—115 **5 Claims**

1. A shirt type garment for assisting a wearer to maintain an arm in intimate contact with a side chest, comprising:

first means secured to an upper side chest portion of the garment near the armpit of the wearer;

second means secured to the corresponding upper side arm portion of the garment near the armpit of the wearer;

said first and second means being in clinging engagement when the upper arm of the wearer is pressed into intimate contact with the upper side chest;

a physical and audible warning being provided when the intimate contact is broken: and

third means disposed intermediate the first and second means to neutralize the clinging engagement of the first and

second means when the upper arm of the wearer is pressed into intimate contact with the upper side chest.

4,058,853

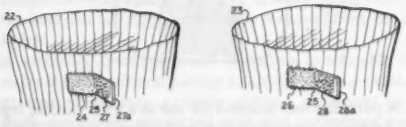
SOCKS WITH FLEXIBLE SELF-CONTAINED FASTENER PATCHES

Rubin Boxer, and Robert Keith Boxer, both of 564 Ricardo Ave., Santa Barbara, Calif. 93109

Continuation-in-part of Ser. No. 617,969, Sept. 29, 1975, abandoned. This application Nov. 17, 1975, Ser. No. 632,818

Int. Cl.[2] A41B *11/00*

U.S. Cl. 2—239 **8 Claims**



1. In the combination of a pair of flexible clothing items and self-contained fasteners secured to each item of the clothing pair, the improved fasteners comprising:

a strip having cooperating adjacent pair of flexible hook-and-pile patches for each item of the clothing pair, one of said patches having said hooks and the other of said patches having said pile, wherein one of the patches is secured to its associated clothing item and the other joined patch is free from said securement and is selectively; and movable to close over the one patch when the clothing item is being worn by the user to prevent clothing of the wearer from catching on the hooks,

said hook-and-pile pair of patches being manually openable so that the patch pair hook-and-pile pair of patches of one clothing item can join with the hook-and-pile pair of patches of the other clothing item of the clothing pair, to hold the items together when they are not being worn.

3. In the combination of a pair of fabric socks and a self-contained fastener secured to each sock to engage each other to hold a sock pair together when not in use, an improved fastener of the flexible type in the form of a flexible patch of hooks secured to the fabric of one of the socks and a flexible patch of pile secured to the other sock, and the two patches adhere to each other when manually pressed together, whereby said flexible fastener will keep a matched pair of socks together during washing and will bend and flex with the socks during washing and thereby prevent stretching and tearing of the fabric of the socks, characterized by a flexible patch secured to the sock having the hooks to selectively cover the hooks when said socks are being worn, so that the clothing of the user will not catch on the hooks and to selectively uncover the hooks when said socks are to be held together for washing.

4,058,854

PROTECTIVE HELMET

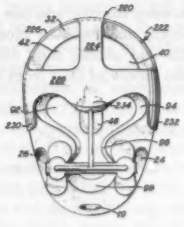
Jhoon Goo Rhee, 4068 Rosamora Court, Arlington, Va. 22207

Continuation-in-part of Ser. No. 598,818, July 24, 1975, Pat. No. 3,992,722, which is a continuation-in-part of Ser. No. 527,910, Nov. 27, 1974, Pat. No. 3,934,271. This application Dec. 9, 1975, Ser. No. 639,060

The portion of the term of this patent subsequent to Jan. 27, 1993, has been disclaimed.

Int. Cl.[2] A42B *1/08*

U.S. Cl. 2—412 **10 Claims**



1. A protective helmet adapted to be worn on a person's head and capable of absorbing energy and generally conforming to the shape of the person's head, said helmet constructed entirely of resilient foam means covered with a tough, pliable surface casing completely enclosing said foam means, said helmet comprising openings in said helmet which are generally contoured in shape to conform to the periphery of the person's ears and chin, a single opening which is generally contoured in shape to conform to the periphery of the person's eyes, nose and mouth, the rear of said helmet being generally open and including a flap member adapted to protect the rear of the head and to aid in the putting on and taking off of said helmet, the upper outer portion of said helmet having secured thereto a liner of a hard impact-resistant material.

4,058,855

CARDIAC PUMPING DEVICE

Thomas M. Runge, 2501 Galewood Place, Austin, Tex. 78701

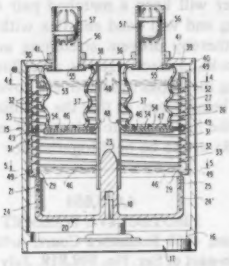
Continuation-in-part of Ser. No. 657,703, Feb. 12, 1976, Pat. No. 4,004,299. This application Jan. 18, 1977, Ser. No. 760,322

Int. Cl.[2] A61F *1/24;* **A61M** *1/03*

U.S. Cl. 3—1.7 **12 Claims**

1. A cardiac pumping unit or the like comprising a housing, a driving motor coupled to the housing and having an output

rotary shaft within the housing, a slitted sleeve coupled to the output shaft and rotating therewith and having a continuous spiral slit with widened slit sections near opposite ends of the sleeve, a translatable drive disc for movement axially of the sleeve and housing, radially shiftable drive arms on the drive disc and engageable drivingly with the spiral slit of the rotary sleeve, the drive arms having outer end head elements of a form resisting passage through said slit but being able to pass through said widened slit sections, camming means for said drive arms on the sleeve near the widened slit sections at one end of the sleeve and operable to force said head elements to



the interior of the sleeve, a camming means near the other end of the sleeve engageable with the drive arms during movement of the drive disc away from the last-named end of the sleeve and shifting the head elements through the widened slit sections at said other end to the exterior of the sleeve, means continually coupled with said disc and resisting rotation of the disc with said sleeve, pliable fluid chamber means disposed within the housing between the disc and one end of the housing, and one-way opening and one-way closing check valve means connected with said pliable fluid chamber means to control the outflow and inflow of fluid from and to the pumping unit.

4,058,856

JOINT ENDOPROSTHESIS

Erhard Doerre, Plochingen, Germany; Manfred Semlitsch, and Otto Frey, both of Winterthur, Switzerland, assignors to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Oct. 12, 1976, Ser. No. 731,224

Claims priority, application Switzerland, Oct. 27, 1975, 13876/75

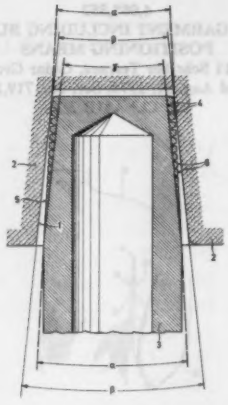
Int. Cl.[2] A61F *1/24*

U.S. Cl. 3—1.91 **10 Claims**

10. A joint endoprosthesis comprising

a female joint part of oxide ceramic material having a cone shaped cavity; and

a male joint part of metal material secured in said female joint part in self-locking relation, said male joint part having a core and a surface layer about said core disposed on a taper smaller than said taper of said cavity and having



a resistance to deformation less than the resistance to deformation of said core.

4,058,857

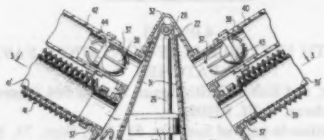
CARDIAC REPLACEMENT PUMPING DEVICES

Thomas M. Runge, 2501 Galewood Place, Austin, Tex. 78703; John E. Burkhalter, 551 E. University Drive, Auburn, Ala. 36830, and Spiros George Pallas, 130 Tenth Ave., Shalimar, Fla. 32579

Filed Feb. 12, 1976, Ser. No. 657,702

Int. Cl.[2] A61F *1/24*; A61M *1/03*

U.S. Cl. 3—1.7 **8 Claims**



1. A pumping unit adapted for use as a total cardiac replacement device comprising a housing having a wedge-like pumping chamber, a drive motor on the housing externally of the wedge-like pumping chamber and having an output rotary shaft extending through said pumping chamber centrally with the axis of the shaft substantially intersecting the apex of said wedge-like pumping chamber, an eccentric cam element on said shaft within said pumping chamber and turning with said shaft, a support shaft extending within the pumping chamber near and parallel to the apex thereof and substantially perpendicular to the axis of said output rotary shaft, a pair of pumping vanes within the wedge-like pumping chamber on opposite sides of said output rotary shaft and being in contact with said eccentric cam element, corresponding ends of said pumping vanes being independently pivotally connected to said support shaft and supported thereby for independent swinging through the pumping chamber around the axis of the support shaft in

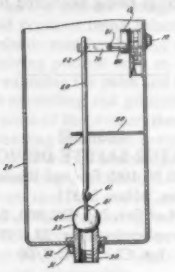
response to rotation of the eccentric cam element with said output rotary shaft, a pair of wedge-like pliable compressible sacs in the pumping chamber between said pumping vanes and the converging walls of the wedge-like pumping chamber and being compressed alternately and cyclically by the pumping vanes during rotation of the eccentric cam element, outlet and return conduit means connected in corresponding walls of said pliable compressible sacs and in the converging walls of the pumping chamber, and pairs of oppositely opening and closing check valves connected in said outlet and return conduit means.

4,058,858

WATER STORAGE TANK FOR FLUSH TOILETS

Liao Che-Wei, No. 115, Chung-Yuan Road, Chung-li, Taiwan, China

Filed Sept. 13, 1976, Ser. No. 722,664
Int. Cl.[2] E03D *1/34*
U.S. Cl. 4—67 R **10 Claims**



1. Apparatus for controlling the quantity of water dispensed from a water storage tank to a flush toilet, comprising:

a water storage tank having a water discharge opening and a closure therefor;

a manually operable adjustable timer for setting a predetermined flush time related to said water discharge opening to dispense a predetermined required quantity to flush water from said water storage tank to the flush toilet, said predetermined required quantity of water being related to the item and quantity thereof to be removed from the flush toilet;

said manually operable timer including a rotatable shaft internal said tank and having a portion thereof extending external of said tank, a cam in said tank positioned on said shaft operatively connected with said connecting means, setting means connected with said shaft for setting the predetermined flush time, said setting means including settable spring means coupled with said shaft and means external of said tank coupled with said shaft for rotation thereof to set said spring for a predetermined flush time, transmission mechanism operatively connected between said settable spring means and said cam, and speed control means operatively connected with said transmission mechanism to control the rotating speed of said cam, and thereby to control the predetermined flush time; and,

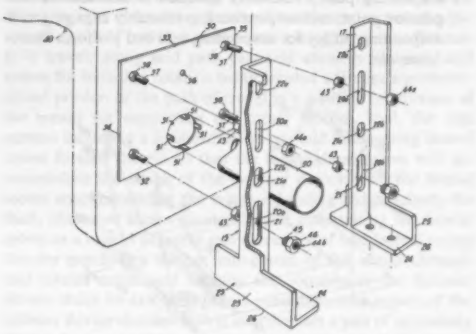
connecting means operatively associated with said timer and connected with said closure to remove said closure from said discharge opening to permit the water from said storage tank to enter the flush toilet for said predetermined flush time.

4,058,859

WATER CLOSET CARRIER

Gordon W. Arrowood, Palmetto, Ga., assignor to McKenney's, Inc., Atlanta, Ga.

Filed Feb. 11, 1976, Ser. No. 657,074
Int. Cl.[2] E03D *11/14*
U.S. Cl. 4—252 R **6 Claims**



1. A water closet carrier of the type which supports in cantilever fashion adjacent a vertical wall, an off-the-floor water closet, comprising:

a. an upstanding bracket member;

b. a plurality of studs projecting laterally from said bracket member for projecting outwardly through said vertical wall;

c. means on said studs for securing the rear portion of said water closet thereto; and

d. adjustment means interconnected between said bracket member and one of said studs for positively and incrementally adjusting the position of said one of said studs with respect to said bracket member while said adjustment means continuously is interconnected between said bracket member and said one of said studs and while said one of said studs remain projecting laterally wherein said certain of said studs projects through a vertically disposed slot in said bracket member and wherein said adjustment means includes a rack with the teeth of the rack projecting into said slot and disposed along one side portion of said slot, said adjustment means also including a pinion disposed on said stud, said pinion being received in said slot and being of a width approximately equal to the width of said slot so that the teeth of said pinion mesh with the teeth of said rack and the width of the slot is sufficient for rotation of said pinion in said slot but is not sufficiently wide to permit slippage of said pinion along said rack; including a nut threadably carried by certain of said studs and wherein said pinion is connected to and rotated by said nut.

4,058,860

SUSPENDED BED WITH HEIGHT CONTROL

Kenneth Daidone, 317 - 100th St., Brooklyn, N.Y. 11209

Filed Mar. 1, 1976, Ser. No. 662,586
Int. Cl.[2] A47C *13/18*
U.S. Cl. 5—10 R **4 Claims**

1. A suspended article of furniture comprising

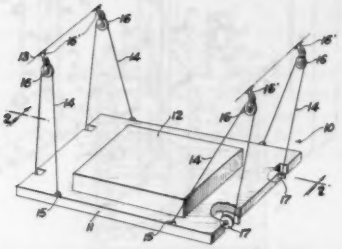
a bed platform including resilient support means located on one side thereof for supporting a load thereon;

a suspension line connected to said bed platform at a first point, and to a ceiling at a second suspension point, for freely suspending said platform from the ceiling;

guiding means located on the underside of said platform with respect to the ceiling comprising cut-outs in said platform for receiving said suspension line, and pulleys, each of said pulleys located adjacent a respective one of

said cut-outs for rotatably engaging said suspension line extending through said respective one cut-out and guiding said suspension line along the underside of said platform parallel one side thereof, at least two of said pulleys being located adjacent one side of said platform, and two of said pulleys located adjacent the opposite side of said one side of said platform;

a suspending pulley releasibly attached to said second suspension point, said suspension line rotatably engaging said suspending pulley for suspending said bed platform therefrom; and



means connected to said bed platform for changing the length of said suspension line between said first point and said second point for changing the relative height of said platform with respect to the ceiling, comprising a drive motor fixedly secured to the underside of said bed platform with respect to the ceiling, rotatably engaging said suspension line and actuatable for drawing said suspension line with respect to said second point, thereby changing the length of said suspension line between said bed platform and said second point.

4,058,861

CABINET

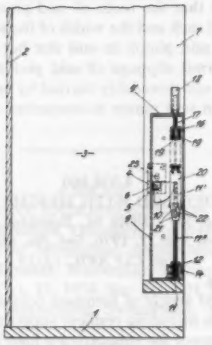
Eckart Kruse, Hirzlistrasse, Uznach (Kt. St. Gallen), Switzerland (8730)

Filed Feb. 13, 1976, Ser. No. 658,106

Claims priority, application Switzerland, Sept. 18, 1975, 12133/75

Int. Cl.² A47C *19/00*

U.S. Cl. 5—164 R **3 Claims**



1. A cabinet-type bed assembly which comprises:

a cabinet formed with a pair of sidewalls flanking an opening;

a bed frame pivotally mounted on said sidewalls and swingable relative to said cabinet between an upright position wherein said bed frame is received in said cabinet and a prone position wherein said bed frame extends from said cabinet through said opening;

a housing received in said bed frame;

a pivot swingably supporting said bed frame on one of said sidewalls and including a nonrotatable pin extending into said housing;

a segment fixed on said pin in said housing and having an arcuate surface therein;

means on said cabinet securing said pin and said segment against rotation;

an elongated traction member in the form of a chain anchored to said segment and adapted to be taken up and paid out from said surface, said traction member having an end remote from said segment;

a holder affixed to said end of said elongated traction member in said housing;

At least one first tension spring anchored at one end to said holder and at another end to said housing;

at least one second tension spring having one end engageable with said holder upon takeup of said elongated traction member by said segment to tension said second spring, said second spring having another end affixed to said housing, said housing having a pair of spaced-apart walls; and a pulley mounted on one of said walls, said elongated traction member extending around said pulley, said other ends of said springs being anchored to the other of said walls.

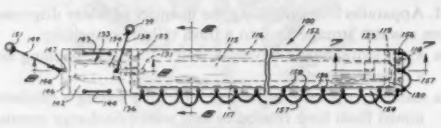
4,058,862

WATER SAFETY DEVICE

Daryl A. Stevens, 610 N. 10th St., and Russell D. Wicktor, Rte. 3, both of Princeton, Minn. 55371

Continuation-in-part of Ser. No. 580,903, May 27, 1975, Pat. No. 3,992,739. This application Nov. 23, 1976, Ser. No. 744,234

Int. Cl.² B63C *9/00*

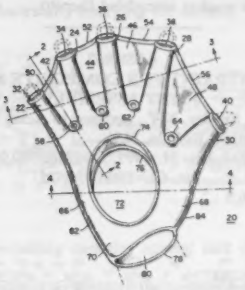
U.S. Cl. 9—14 **22 Claims**

1. A safety device to enable a rescuer person to lend assistance to a remote imperiled victim comprising: elongate tubular means inflatable to form a substantially linear semi-rigid elongate, floatable unit having a first end that, when inflated, can be maneuvered toward an imperiled victim, and a second end that can be manipulated by a rescuer person for maneuvering the first end, and deflatable for folding into a compact bundle, said tubular means having at least a first tubular member and a second tubular member, and means having a restricted orifice connecting the first tubular member with the second tubular member to allow gas to flow from the first tubular member to the second tubular member to inflate the second tubular member after the first tubular member has been inflated and elongated by gas, gas supply means for storing a supply of gas, and releasable valve means connecting the gas supply means with the first tubular member and operable for selective rapid release of gas from the gas supply means to the first tubular member, said means having a restricted orifice defining an orifice of a size to restrict flow of gas from the first tubular member to the second tubular member such that rapid release of gas from the gas supply means first inflates the first tubular member to a semi-rigid elongate shape and then inflates the second tubular member.

4,058,863

SWIMMING GLOVE

Vincent Ferdico, 85 Maplewood St., West Hempstead, N.Y. 11552

Filed Jan. 19, 1977, Ser. No. 760,671
Int. Cl.[2] A63B *31/02*
U.S. Cl. 9—308 5 Claims



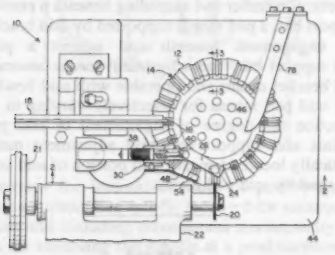
1. A swimming glove for placement over the hand, comprising: an integral elastic member having hollow elongate finger receiving portions and a hollow elongate thumb receiving portion, each of said portions being joined to one another by web portions, said elastic member having an integral extended palm and wrist receiving portion with an enlarged transverse opening therein for exposing the palm and the back of the hand of the wearer while encircling and grasping the outer perimeter of the hand and wrist of the wearer, there being a thickened first rib portion extending about the periphery of said elastic member to provide reinforcing means therefor, each adjacent pair of said finger receiving portions converging together at a juncture remote from the free end of said finger receiving portions, each of said junctures having located thereat a thickened second rib portion having an annular contour in the plane of said swimming glove for maintaining said finger receiving portions in spread apart relationship.

4,058,864

SCREW SHANK SLOTTING MECHANISM

Richard Harlon Morland, Elgin, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Dec. 20, 1976, Ser. No. 752,043
Int. Cl.[2] B23G *9/00*
U.S. Cl. 10—2 4 Claims



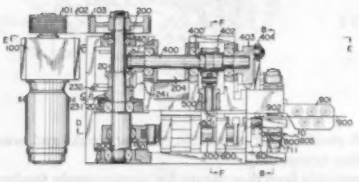
1. A machine for slotting fastener devices having a head and shank with wings extending radially from the shank, including a rotatable turret for conveying the fastener devices about a predetermined path of travel and having, at its periphery, a plurality of circumferentially spaced pockets opening outwardly from the periphery, each of the pockets including an elongated seat portion positioned therein with the longitudinal dimension of the seat traversing the path of travel, said seat portions adapted to receive and support one side of a fastener device shank throughout its length with its other side exposed for facilitating an operation performed at a work station adjacent the path of travel, means for supporting a rotary slotting tool mounted at a work station for generally back and forth movement in a predetermined direction adjacent a predetermined portion of the path of travel, the rotary slotting tool adapted to engage a region of the exposed side of the fastener device, means for inducing rotation of the fastener device about its axis, comprising an abrasive element mounted adjacent the path of travel so as to create a drag force on a fastener as it travels along said path past said abrasive element, said means for inducing rotation being located adjacent a predetermined portion of the path of travel in a position in advance of the means for supporting the rotary slotting tool, the seat portion including a longitudinal recess and intersecting lateral recess formed therein so that the longitudinal recess will accommodate the shank of the fastener device with the lateral recess accommodating the wings extending radially from the shaft, abutment means located in and interrupting the lateral recess in a region adjacent one extremity of said lateral recess thereby precluding further movement of the wings through said lateral recess and limiting the rotation of the fastener device about its axis to expose a predetermined region of the fastener device shank which is intermediate a pair of oppositely disposed wings to the rotary slotting tool as a result of engagement of the radially extending wings with the abutment means.

4,058,865

AUTOMATIC HIGH-SPEED COLD HEADING MACHINE

Yuan Ho Lee, 85, Jen Ho Road, Tainan, China /Taiwan

Continuation-in-part of Ser. No. 733,898, Oct. 19, 1976, which is a continuation of Ser. No. 525,091, Nov. 19, 1974, abandoned. This application Jan. 14, 1977, Ser. No. 759,371
Int. Cl.[2] B21K *1/46*
U.S. Cl. 10—13 11 Claims



1. An automatic high speed cold heading machine comprising the combination of:

a main shaft which includes an eccentric portion thereon;

punching means, including a ram operably connected to said main shaft so that said ram reciprocates upon rotation of said main shaft, for punching blanks in a die to form a finished product;

a second shaft which includes an eccentric portion, said second shaft being operably geared to said main shaft;

blank cutting means operably connected to said second shaft so that said blank cutting means reciprocates upon rotation of said second shaft for cutting blanks;

means for receiving cut blanks from said blank cutting means;

a rotary die head having a plurality of dies respectively positioned in alignment with said ram, said rotary die head being operably connected for rotation to said second shaft;

a third shaft operably geared at about one end thereof to said main shaft;

a fourth shaft operably geared to the other end of said third shaft, said fourth shaft including an eccentric portion thereof;

ejecting means, including a rocker arm pivotably connected to the eccentric portion of said fourth shaft and coacting

with rod means on said rotary die head, for ejecting blanks from said die head; and

means for rotating said main shaft so that the main shaft imparts a compressive force against the rotary die head while the second shaft simultaneously drives the blank cutting means to cut a blank and feed a blank to the cut blank receiving means at the same time that the fourth shaft simultaneously drives the rocker arm to engage with and apply a force against a rod of said rod means causing said rod to cause a blank disposed in a die to be ejected therefrom, said blank cutting means, said punching means and said ejecting means being driven simultaneously and independently by said second shaft, said main shaft and fourth shaft respectively in a synchronized harmonious motion without significant pause or dwell.

4,058,866

MACHINES FOR HANDLING AND ASSEMBLING FASTENERS AND WASHERS

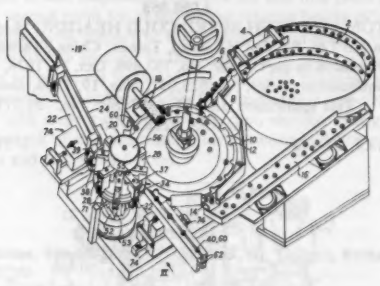
Graham Terence Foster, Birmingham, England, assignor to Linread Limited, Birmingham, England

Filed May 17, 1976, Ser. No. 687,373

Claims priority, application United Kingdom, June 10, 1975, 24916/75

Int. Cl.[2] B23P *19/08*

U.S. Cl. 10—155 A **12 Claims**



1. A machine for assembling screw blanks and washers, said machine comprising:

a rotatable feed disc means for continuously feeding washers in succession along a first path, said feed disc means having a plurality of notches formed around the periphery thereof, each notch being adapted to receive a single washer;

rotatable turret means for continuously conveying screw blanks in succession along a second path in a plane parallel to and vertically above said first path;

drive means for continuously rotating said turret means and said feed disc means respectively in opposite directions and in timed relationship such that said screw blanks are conveyed in timed relationship to the feed of washers along the first path such that each screw blank is in turn brought into axial alignment with a respective washer;

said turret means including a plurality of circumferentially spaced clamping heads each of which heads is adapted to receive and clamp an individual screw blank therein, each said clamping head comprising a relatively fixed jaw member having an open-ended slot adapted to recieve the shank of a screw blank and a cooperating relatively movable jaw member resiliently biased towards the respective said fixed jaw member to engage the head of a screw blank the shank of which is received within said slot in said respective fixed jaw member, means mounting each clamping head in said turret means for movement parallel to the axis of rotation of the turret means, and means for moving each said clamping head containing a screw blank downwardly as said clamping head approaches a line containing the centers of rotation of said turret means and said feed disc means at a position above said feed disc means and substantially in axial alignment with a washer approaching said line and moving along said first path and thereby moving and inserting the screw blank into the washer, thereby assembling the screw blank and the washer; and

means for withdrawing from said clamping head the blank having the washer assembled thereto.

4,058,867

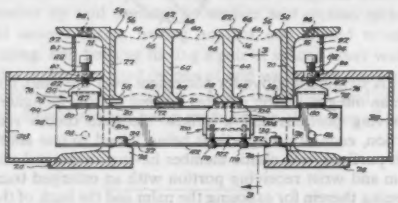
UPLIFT RESTRAINT FOR COMPOSITE EXPANSION JOINT ASSEMBLY

Guy S. Puccio, Snyder, N.Y., assignor to Acme Highway Products Corporation, Buffalo, N.Y.

Filed Jan. 21, 1977, Ser. No. 760,908

Int. Cl.[2] E01D *19/06*

U.S. Cl. 14—16.5 **5 Claims**



1. In a composite expansion joint assembly comprising:

a pair of edge members adapted to define the opposite sides of an expansion groove between bridge deck sections;

said edge members having corresponding, elongated openings extending lengthwise of said edge members; laterally spaced support bars extending transversely of said groove with the opposite ends of said bars extending through said openings beyond the opposite sides of said groove;

a plurality of elongated resiliently yieldable sealing elements in a side-by-side relation extending longitudinally of said groove;

elongated rigid structural members interposed between said sealing elements and extending lengthwise thereof;

said structural members being supported above said support bars for lateral sliding movement relative thereto; and uplift restraint means on at least one of said structural members and said support bars for limiting vertical displacement of the former relative to the latter, said uplift restraint means including bracket means affixed to said structural member and extending beneath a portion of said support bar, a pad means supported by said bracket means for engagement beneath and against a portion of said support bar, and adjustment means associated with said bracket means and operable with said bracket means and said pad means for selectively varying in a vertical direction the degree of engagement of said pad means against said support bar, said adjustment means being vertically located beneath said portion of said support bar engaged by said pad means.

4,058,868

CAPSULE CLEANING AND POLISHING

Robert J. Champion, Greenville, S.C., assignor to Perry Industries, Inc., Hicksville, N.Y.

Filed June 10, 1976, Ser. No. 694,789

Int. Cl.[2] B08B *7/04*

U.S. Cl. 15—4 **14 Claims**

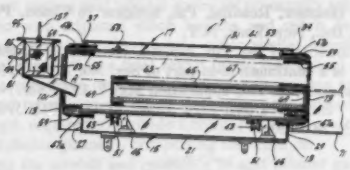
1. Capsule cleaning and polishing apparatus comprising:

means providing a delivery passage for capsules;

a screen;

means mounting the screen at a level above the delivery passage with one side of the screen facing in the direction toward the delivery passage and with the screen positioned relative to the delivery passage to have capsules impelled against said one side thereof for dislodging dust from the capsules and to have the capsules drop down from the screen through the delivery passage after impacting against the screen;

means for electrically charging the screen;



means for impelling capsules against said one side of the screen;

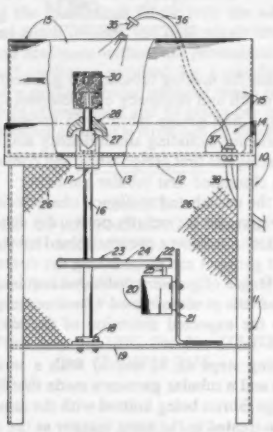
means for drawing air through the screen from the other side thereof to draw off dust through the screen; and means for receiving capsules dropping down from the screen through the delivery passage and buffing the capsules after they have impacted against the screen for removing any residual dust from the capsules and polishing them.

4,058,869

SCRUBBING APPARATUS FOR POTTERY GREENWARE

Howard R. Wheeler, Crooksville, Ohio, assignor to Nelson McCoy Pottery Company, Roseville, Ohio

Filed Jan. 22, 1976, Ser. No. 651,459
Int. Cl.² A47L *15/38*
U.S. Cl. 15—101 **5 Claims**



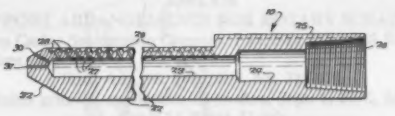
1. Apparatus for internal cleaning of pottery greenware comprising an upstanding spindle mounted for rotation about a vertical axis and including drive means mechanically coupled therewith for revolving the spindle at a predetermined speed, surface abrading means secured to said spindle at the upper end to be revolved therewith, said spindle formed with an axially extending slot opening transversely of said spindle and at the upper end thereof, said abrading means being a body formed from a resiliently flexible material which is relatively porous with said body projecting radially outward from opposed sides of said spindle and having a body thickness substantially greater than the width of said slot so as to project a distance above the upper end of said spindle and compressible in the central region to frictionally interfit in said slot.

4,058,870

LANCE TIP CONSTRUCTION

Robert J. Goodwin, Hendersonville, N.C., assignor to C. H. Heist Corporation, Clearwater, Fla.

Filed July 9, 1976, Ser. No. 704,113
Int. Cl.² B08B *9/02*
U.S. Cl. 15—104.1 R **30 Claims**



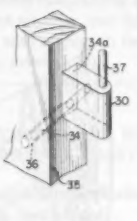
1. A tube cleaning lance tip construction for rotation within a tube comprising a body portion having a longitudinal axis and an outer surface, first bore means in said body portion for receiving high pressure liquid, second bore means in communication with said first bore means and extending through said body portion to said outer surface for causing liquid to be ejected with a lateral component creating a reactive force for biasing said body portion toward the inside of said tube, blade means on the opposite side of said body portion from said second bore means for removing incrustations from the inside of said tube, said second bore means being positioned relative to said longitudinal axis of said body portion for causing said reactive force to be in the direction of rotation of said body portion.

4,058,871

HINGE ASSEMBLY FOR KNOCK DOWN FURNITURE

Takeshi Shimizu, 6-24-22, Kami-soshigaya, Setagaya, Tokyo, Japan

Filed Nov. 24, 1975, Ser. No. 634,733
Int. Cl.² F05D *1/06*
U.S. Cl. 16—172 **3 Claims**



1. A hinge for knock-down furniture, comprising:

at least two base blocks, at least one first base block associated with a stationary portion of said furniture and at least one second base block associated with a movable portion of said furniture;

hinge pin means between said base blocks for pivotally joining said base blocks;

at least one first tenon member obliquely extending from said first base block into said stationary furniture portion; and

at least one second tenon member obliquely extending from said second base block into said movable furniture portion.

4,058,872

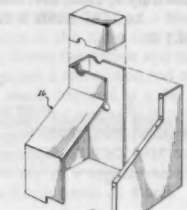
SHEEP AND LAMB MECHANICAL TOE-BREAKER

J. R. Henry, and Willis E. Teague, both of San Angelo, Tex., assignors to Armour and Company, Phoenix, Ariz.

Filed May 4, 1976, Ser. No. 683,607
Int. Cl.² A22B *5/00*
U.S. Cl. 17—1 R **6 Claims**

1. An apparatus for mechanically breaking the toes of sheep

carcasses as said carcasses are presented by a killing chain comprising: a frame, a pair of cooperating guide members carried by said frame having means defining a slot for tempo-



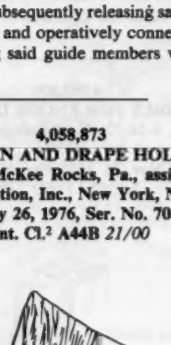
rarily engaging and subsequently releasing said toes, and means carried by said frame and operatively connected to said guide members for rotating said guide members while the toes are temporarily engaged.

4,058,873

CURTAIN AND DRAPE HOLDER

Edward T. Fischer, McKee Rocks, Pa., assignor to The Raymond Lee Organization, Inc., New York, N.Y.

Filed July 26, 1976, Ser. No. 708,496
Int. Cl.[2] A44B *21/00*
U.S. Cl. 24—73 CH **2 Claims**



1. An assembly adaptable for mounting to a side panel of a window opening for the purpose of gathering a hung curtain, comprising

a flat base plate pivotably mounted by a rivet to an arm member of generally rectangular cross-section, with said plate fitted with rotational stop means to limit the travel of the arm member in each of two directions, with

said rotational stop means comprising two spaced pins fixed to the plate that project from the external face of the plate, said pins located with respect to the rivet so that in the installed position of the plate against a window opening side panel, the arm member may be rotated to a first position in which a first straight edge of the arm member rests on a first pin, with the axis of the arm member extending along a generally horizontal axis or alternately the arm member may be rotated to a second position in which a second straight edge of the arm member rests against the second pin with the axis of the arm member extending along a generally vertical axis,

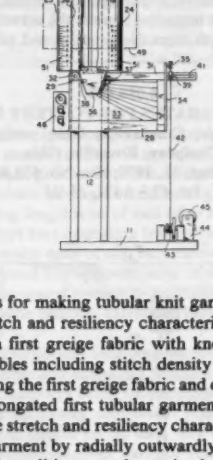
said base plate formed with a plurality of holes for use in fastening the plate to a window opening panel.

4,058,874

METHOD FOR KNITTING AND PRE-SHRINKING KNIT FABRICS IN ACCORDANCE WITH PRE-DETERMINED COMFORT LEVELS

Franz Hausner, Reading, Pa., assignor to Cluett, Peabody & Co., Inc., New York, N.Y.

Continuation of Ser. No. 295,866, Oct. 10, 1972, abandoned, which is a continuation-in-part of Ser. No. 129,813, March 31, 1971, abandoned. This application May 7, 1975, Ser. No. 575,571
Int. Cl.[2] D04B *1/24*; D06C *21/00*; G01L *5/06*
U.S. Cl. 28—153 **6 Claims**



1. A process for making tubular knit garment products having desired stitch and resiliency characteristics, comprising:

a. knitting a first greige fabric with known predetermined knit variables including stitch density and stitch length;

b. pre-treating the first greige fabric and converting the same into an elongated first tubular garment;

c. testing the stretch and resiliency characteristics of the first tubular garment by radially outwardly distending beyond its relaxed condition a predetermined substantial length of the first garment and determining the distending force per unit of length of garment distended required to distend the garment to a predetermined extent corresponding generally to the expected distinsion of the said first garment when worn in use;

d. repeating steps a), b) and c) with a series of n greige fabrics and n tubular garments made therefrom, the series of greige fabrics being knitted with the same knit variables and pre-treated in the same manner as the said first greige fabric except that stitch density and stitch length are altered in each fabric in the series;

e. observing and recording the relationship between said distending force per unit length of garment distended and stitch density and stitch length of greige fabric for each garment tested;

f. selecting from the relationships observed and recorded from step e) a stitch density and stitch length yielding a garment having a resistance to distension force in its worn condition of between 8 and 40 grams per inch;

g. knitting a final tubular knitted greige fabric in the same manner and having the same predetermined knit variables as said first greige fabric except for stitch density and stitch length, and with a stitch density and stitch length determined by step f) to yield a garment having a resis-

tance to distension force in its worn condition of between 8 and 40 grams per inch;

h. pre-treating the final greige fabric in the same manner as the first greige fabric and converting same into tubular knit garment products, said products having desired stretch and resiliency characteristics derived from the above-recited process.

4. In a process for making a tubular, knit garment having a desired comfort fit, and which process comprises: knitting a fabric, said knit fabric being knit with a predetermined stitch length and stitch density; converting said knit fabric to a tubular garment; testing said tubular garment; repeatedly reknitting said fabric with adjusted stitch lengths and stitch densities; converting said reknit fabrics into other similar tubular garments; and converting a final reknit fabric into a final similar tubular garment; the improved procedure for testing and reknitting said tubular garments to determine stitch density and stitch length required to provide a comfort fit for the wearer of the final tubular garment, comprising the steps of:

a. testing the stretch and resilience of said tubular garments along a substantial length of the garments by determining the forces per lineal dimension of garment required to outwardly distend said knit and reknit fabrics to their condition of stress as said knit and reknit fabrics are used in similar tubular garments;

b. obtaining the relationship between the tested stretch and resilience of the tubular garments with a predetermined range of stretch and resilience required for a comfort fit for the wearer of a similar tubular garment of between 8 and 40 grams per inch of length when the similar tubular garment is stretched to actual wear conditions, said predetermined range of stretch and resilience being the range of force per lineal dimension of garment required to distend the similar tubular garment consistent with the comfort of the wearer of said tubular garment; and

c. adjusting stitch length and stitch density in accordance with the relationships between stitch length and stitch density and comfort fit as determined in step (b), and reknitting the final reknit fabric with the adjusted stitch length and stitch density, the final reknit fabric having a stretch and resilience within said predetermined range of stretch and resilience required for a comfort fit for the wearer of a similar tubular garment made from the final reknit fabric of between 8 and 40 grams per inch when the last-said tubular garment is stretched to actual wear conditions.

4,058,875

METHOD OF ASSEMBLING A MASK-PANEL ASSEMBLY OF A SHADOW-MASK CATHODE-RAY TUBE

Jawdat Ibrahim Nubani, Clarks Summit, and Walter Robert Rysz, Moosic, both of Pa., assignors to RCA Corporation, New York, N.Y.

Filed Aug. 18, 1976, Ser. No. 715,372
Int. Cl.² H01J 9/18
U.S. Cl. 29—25.15 **10 Claims**

PRECOAT INNER SURFACE OF A FACEPLATE PANEL WITH FILM OF ORGANIC MATERIAL
11
MOUNT AND O-SET MASK IN FACEPLATE PANEL
13
BAKE FACEPLATE PANEL TO VOLATILIZE FILM OF ORGANIC MATERIAL
15

1. In a method for assembling a mask-panel assembly for a shadow-mask cathode-ray tube, the steps in the following order:

a. precoating the inner surface of the panel of said assembly with a film of organic material, which film is volatilizable when heated in air at temperatures up to about 400° C,

b. mounting the mask of said assembly in said panel at a predetermined spaced position relative to said inner surface,

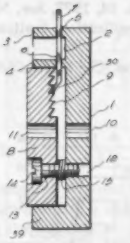
c. and then baking said panel in air at temperatures sufficient to volatilize said film.

4,058,876

SUPPORT ARRANGEMENTS FOR ROTARY SCRAPERS

Pedro Carlos Segismundo Clamans, P.O. Box 400, 1000 Buenos Aires, Argentina

Filed Aug. 18, 1976, Ser. No. 715,475
Claims priority, application Argentina, Sept. 1, 1975, 260212
Int. Cl.² B23D 71/00
U.S. Cl. 29—78 **6 Claims**



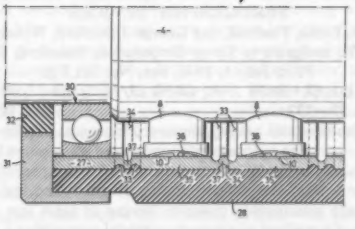
1. A rotary scraper, comprising a plurality of scraper rods, an annular support member formed with a plurality of radial openings through which the scraper rods extend respectively, a position-maintaining member, and releasable clamping means for urging the position-maintaining member into contact with the support member, one of said members having non-slip surface portions against which said rods engage for securing the rods against radial movement with respect to the support member when the position-maintaining member is urged into contact with the support member, and the rods being displaceable radially outwards with respect to the support member on release of the clamping means.

4,058,877

DEFLECTION-CONTROLLED ROLL FOR THE PRESSURE TREATMENT OF MATERIALS IN WEB FORM

Rolf Lehmann, Mutschellen AG, Switzerland, assignor to Escher Wyss Limited, Zurich, Switzerland

Filed Apr. 6, 1976, Ser. No. 674,236
Claims priority, application Switzerland, Apr. 15, 1975, 4778/75
Int. Cl.² B21B 13/02
U.S. Cl. 29—116 AD **11 Claims**



1. A deflection-controlled roll for the pressure treatment of

materials in web form comprising a fixed beam, a continuous cylindrical roll shell rotatable about the beam, an elastomeric covering on the roll shell and a plurality of hydraulic piston support devices positioned along the length of the roll for exerting support forces between the beam and the roll shell at respective operating surfaces of the devices, said roll shell having annular portions with smooth inner surfaces aligned with and forming runways for said operating surfaces of said support devices and circumferential zones spaced along the length thereof between said annular portions of greater flexibility than said annular portions for reducing the stiffness of the shell to lateral forces imposed thereon during operation.

4,058,878

CONTROLLED DEFLECTION ROLL

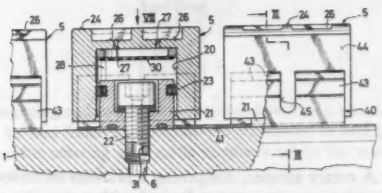
Rolf Lehmann, Mutschellen AG, Switzerland, assignor to Escher Wyss Limited, Zurich, Switzerland

Filed Feb. 14, 1977, Ser. No. 768,473

Claims priority, application Switzerland, Mar. 1, 1976, 2492/76

Int. Cl.² B21B *13/02*

U.S. Cl. 29—116 AD **11 Claims**



1. A controlled deflection roll comprising:
a stationary support;
a substantially tubular-shaped roll shell;
means for mounting said substantially tubular-shaped roll shell to be rotatable about said stationary support;
a plurality of movable substantially piston-like hydrostatic pressure elements located between said stationary support and said roll shell;
said pressure elements including contact surface means which serve to support the roll shell;
said pressure elements having substantially flat side surfaces extending in the direction of movement of said pressure elements;
said side surfaces of neighboring pressure elements being located in substantially a common plane;
connection means for connecting neighboring pressure elements;
said connection means comprising resilient flaps which bear against the flat side surfaces of at least two neighboring pressure elements.

4,058,879

COMPOSITIONS AND METHOD FOR ENHANCING ELECTRICAL LIFE OF POLYMERS USED IN XEROGRAPHIC DEVICES

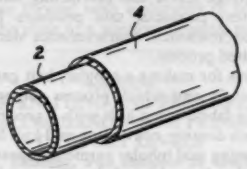
James A. Lentz, Penfield, and George J. Safford, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed July 1, 1976, Ser. No. 701,710

Int. Cl.² B60B *5/00*; G03G *13/14*; B32B *27/40*

U.S. Cl. 29—132 **28 Claims**

1. A transfer roll having improved electrical life for electrically cooperating with a photoconductive plate when brought into contact therewith to attract charged toner particles from the plate toward the roll comprising a rigid cylindrical core of electrically conductive material having at least one coating thereon of a resilient elastomeric material comprising a copolymer of about 1.0 percent to about 12.0 percent terminally unsaturated hydrocarbon nitrile and the balance butadiene, said copolymer containing a sufficient amount of conductivity control agent to produce a copolymer having the desired



resistivity, the conductivity control agent being solubilized in the copolymer.

4,058,880

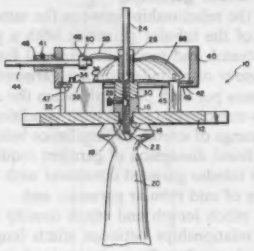
PROPELLER MAKING APPARATUS AND METHOD

Emerson Dee Hughey, 840 E. 64th St., Indianapolis, Ind. 46240

Division of Ser. No. 679,984, April 26, 1976, Pat. No. 4,009,874. This application Oct. 18, 1976, Ser. No. 733,345

Int. Cl.² B23P *15/04*

U.S. Cl. 29—156.8 P **6 Claims**



1. A method of making a propeller from a propeller hub and a plurality of propeller blade blanks, comprising the steps of receiving the propeller hub over a vertically extending shaft fixed to a base; positioning the blade blanks in contact with said hub and with a plurality of support means corresponding in number to the number of blade blanks and equiangularly arranged on said base radially outwardly from said hub; receiving one edge of each blade blank in holding means disposed above said support means whereby each blade blank is supported by contact with said hub, one of said support means, and said holding means; rotating said holding means with respect to said support means to selectively alter the pitch angle of the blade blanks with respect to said hub; and connecting each of the blade blank to the hub.

4,058,881

APPLICATION MACHINE FOR MOUNTING CIRCUIT BOARD PINS WITH AN IMPROVED CONTROL SYSTEM

John Henry Gavin, Lancaster, and John Martin Spickler, Marietta, both of Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

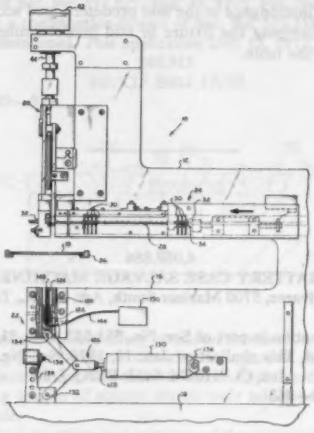
Filed Jan. 21, 1976, Ser. No. 651,115

Int. Cl.² H05K *13/04*

U.S. Cl. 29—715 **1 Claim**

1. In an application machine for staking a contact in a hole in a circuit board comprising a base, a mounting plate extending from the base, a support mounted between the mounting plate and the base for receiving a circuit board and positioning a hole in the circuit board for receiving a contact, a punch assembly mounted on the mounting plate for staking a contact in the hole in the circuit board, an extendable anvil mounted on the base for supporting the circuit board during staking of a contact in the hole in the circuit board; said anvil including a bore in alignment with the punch assembly, the improvement

comprising a fluidic sensor in communication with the bore in the extendable anvil for sensing the presence of a clear hole in the circuit board for receiving the circuit board contact before said punch stakes the contact in the hole in the circuit board, and control means responsive to the fluidic sensor for prevent-



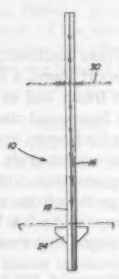
ing actuation of said punch when a clear hole in the circuit board is not in alignment with the bore in said extendable anvil, said control means including a limit switch responsive to extension of said anvil and means to retract said extendable anvil and prevent actuation of said punch when a clear circuit board hole is not present for receiving a contact.

4,058,882

METAL FENCE POST AND METHOD OF MAKING

Ernest R. Muckelrath, Tioga, N. Dak., assignor to Tioga Air Heaters, Co., Tioga, N. Dak.

Filed Oct. 15, 1975, Ser. No. 622,426
Int. Cl.² B23Q *17/00*
U.S. Cl. 29—407 **1 Claim**



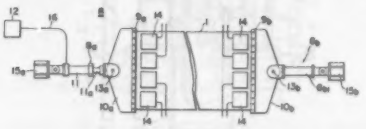
1. A method of making a fence post comprising; the step of marking a long rectangular strip of metal at points therealong to be metal worked, then the step of punching holes at appropriate points along the center line of said strip, the further step of bending the strip along the center line to an approximately 100° included angle, next the step of bending inwardly each of the edges of the partially formed post at approximately a 110° included angle to form a post of generally polygon shape with one open side portion so that said post will resist twisting and bending when driven and erected, the additional step of providing a small rectangular strip of metal, cutting two corners of said rectangular member from the lengthwise side thereof to form a basic triangular anchoring plate, welding said anchoring plate to the open side portion of the polygon shaped post, and the further step of sharpening the lower slanted edges of the anchoring plate as well as the lower edges of the post itself to make the force necessary for driving same even less.

4,058,883

FABRICATION OF PANEL STRUCTURES HAVING THIN SKIN PLATE IN VEHICLES, WATER CRAFT, BUILDINGS, AND THE LIKE

Toshio Yoshida, Kobe; Kiyoshi Terai, Ashiya; Shigetomo Matsui; Tsuneo Kinoshita, both of Kobe; Akira Hoshi, Ashiya, and Toru Tohmoto, Nishinomiya, all of Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan

Filed Jan. 22, 1976, Ser. No. 651,282
Claims priority, application Japan, Jan. 27, 1975, 50-11641; Jan. 27, 1975, 50-11642
Int. Cl.² B23P *11/02*; B23K *28/02*
U.S. Cl. 29—448 **8 Claims**



1. A method of fabricating a panel structure of the type having a skeletal framework and a skin plate secured to the framework comprising the steps of:

subjecting the skin plate to tensile stretching within the geometric surface thereof to produce a constraining tensile stress in the skin plate not exceeding the tensile elastic limit of the skin plate, the tensile stress being adequately applicable to at least a portion thereof;

concurrently heating the skin plate locally at portions thereof to which the constraining tension cannot be adequately applied to a temperature above room temperature to induce thermal expansion of the skin plate within its geometric surface;

welding the stressed and locally heated skin plate to the framework;

simultaneously maintaining the stressed and heated condition of the skin plate; and

thereafter releasing the skin plate from the tensile stretching and from the heating so as to leave a tensile residual stress in the skin plate to prevent undesirable deformation thereof in the fabricated panel structure.

4,058,884

AUTOMATIC SCREW DRIVER SYSTEM AND METHOD FOR UTILIZING SAME

Ralph P. Lydon, 2616 N. 75th St., Wauwatosa, Wis. 53213, and Weismueller, Sr. William A., Rte. 1, Box 29, Oostburg, Wis. 53070

Filed Oct. 18, 1976, Ser. No. 733,287
Int. Cl.² B25B *23/08*; B23P *19/06*
U.S. Cl. 29—526 R **11 Claims**

11. A method for automatically prepositioning screw devices and for screwing said screw devices into objects through the use of an inverted automatic air-operated screw driving system having a spring-loaded screw device locator, said locator having means for distributing the torque applied to said object, a locator guide, and a pneumatically powered driver and activation system for initiating the rotation of said driver and said screw device comprising the steps of:

a. positioning said screw device in said locator in an inverted fashion,

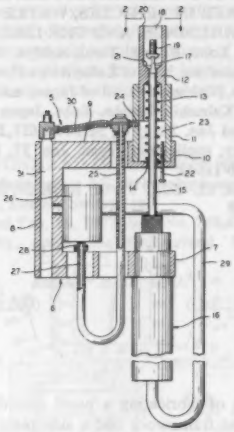
b. aligning said object up to and in contact with said locator at the desired location of screw device at fixation,

c. preliminarily activating and rotating said pneumatically powered driver for rotation of said screw device by de-

pressing said locator which in turn blocks said pneumatic activation system to route air into said driver;

d. depressing said locator further with said object thereby drawing said screw device into contact with said object;

e. driving said screw device into said object to a desired depth;



f. distributing the torque applied to said object through said locator after driving said screw device into said object to a desired depth;

g. removing said object and affixed screw device from said automatic screw driver thereby separating said screw from said driver.

4,058,885

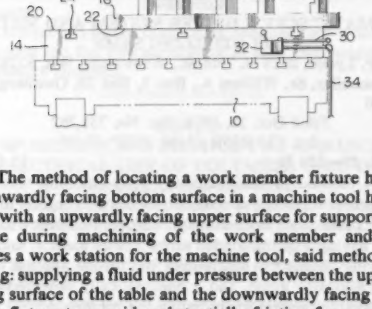
METHOD FOR LOCATING AND CLAMPING A WORK MEMBER SUPPORTING FIXTURE

Raymond A. Bergman, 107 E. Second St., Minster, Ohio 45865

Filed May 10, 1976, Ser. No. 684,725

Int. Cl.² B23Q *7/00*

U.S. Cl. 29—559 **7 Claims**



1. The method of locating a work member fixture having a downwardly facing bottom surface in a machine tool having a table with an upwardly facing upper surface for supporting the fixture during machining of the work member and which defines a work station for the machine tool, said method comprising: supplying a fluid under pressure between the upwardly facing surface of the table and the downwardly facing surface of the fixture to provide substantially friction free support of the fixture on the table, moving the fixture to a desired predetermined first position on the table, causing cooperating pairs of elements of locating means on the table and fixture surfaces to interengage in the said predetermined first position of the fixture on the table, clamping the fixture in said predetermined first position to the table for machining, subsequently unclamping the fixture, again supplying fluid under pressure between the fixture and table surfaces, and, while always maintaining the fixture on the table within the work station and maintaining at least one pair of locating means engaged, moving the fixture to a predetermined new and distinct second position on the table through translation and rotation, causing cooperating pairs of elements of locating means on the table and fixture surfaces to interengage in the said predetermined second position, and clamping the fixture in said predetermined second position to the table.

4,058,886

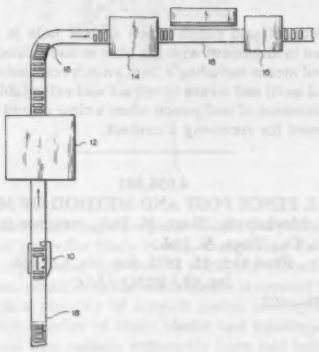
BATTERY CASE SALVAGE MACHINE

Oscar E. Alvarez, 5700 Mariner South, Apt. 701 E., Tampa, Fla. 33609

Continuation-in-part of Ser. No. 551,523, Feb. 21, 1975, abandoned. This application Jan. 12, 1976, Ser. No. 648,047

Int. Cl.² H01M *6/52;* B23Q *7/00*

U.S. Cl. 29—563 **19 Claims**

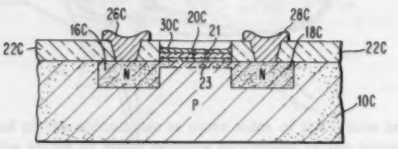


1. A battery casing salvage machine comprising a conveyor means mounted on a support frame, a first and second station mounted on said support frame, and an automatic feed means mounted on said support frame, said conveyor means disposed relative to said automatic feed means to receive battery casings therefrom at predetermined intervals, said first station arranged in operative communication with said conveyor means to receive battery casings therefrom at predetermined intervals, said first station comprising a first battery support means, a first cutting means arranged above said first battery support means and a battery movement means movably mounted on said support frame, said battery movement means disposed relative to said conveyor means to engage the battery casing thereon and move the battery casing on said first battery support means through said first cutting means to cut at least a portion of the battery casing from the remainder thereof, said second station arranged in operative communication with said conveyor means to receive battery casings therefrom at predetermined intervals from said first station, said second station comprising a second battery support means and a second cutting means arranged above said second battery support means, said second cutting means including a cutting element movably mounted on said second station to permit movement thereof perpendicular to the axis of said second battery support means, said cutting element disposed to engage battery casings on said second battery support means.

4,058,887
METHOD FOR FORMING A TRANSISTOR COMPRISING LAYERS OF SILICON DIOXIDE AND SILICON NITRIDE

David Dewitt, Poughkeepsie, N.Y., assignor to IBM Corporation, Armonk, N.Y.

Division of Ser. No. 117,077, Feb. 19, 1971, Pat. No. 3,707,656, which is a continuation-in-part of Ser. No. 572,119, Aug. 12, 1966, abandoned. This application Oct. 13, 1972, Ser. No. 298,311
Int. Cl.[2] B01J *17/00*
U.S. Cl. 29—571 17 Claims



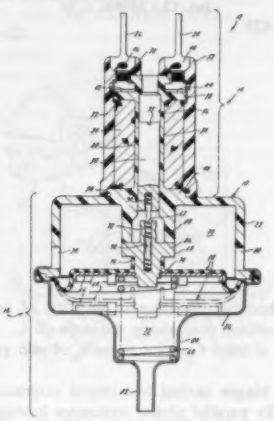
1. A method of field effect transistor fabrication comprising
applying layer of silicon dioxide on surface of monocrystalline semiconductor substrate of one type conductivity;
applying a layer of silicon nitride over said layer of silicon dioxide;
etching away coincident portions of the composite layers of silicon dioxide and silicon nitride to leave a defined portion of said composite representing the gate insulation of said transistor;
using said defined gas insulation composite as a mask in the formation of two spaced regions of another type conductivity in said substrate respectively extending from said surface on opposite sides of said gate insulation, said two regions representing the source and drain region of said transistor;
forming a layer of silicon dioxide having a greater thickness than said gate insulation composite over said two regions;
depositing a gate electrode over the gate insulation composite; and
forming a current carrying conductive metal land pattern on said thicker silicon dioxide layer, said pattern being connected respectively to said gate electrode and said source and drain regions, thereby providing a high capacitive effect on the portion of the semiconductor substrate beneath the gate insulation and a low capacitive effect on the portion of the substrate beneath the thicker oxide layer.

4,058,888
METHOD OF CALIBRATING VARIABLE INDUCTANCE TRANSDUCERS

Lawrence William Tomczak, Sterling Heights; Frederick William Crall, Farmington; LaVerne Andrew Caron, Sterling Heights, and Walter Joseph Campau, Grosse Pointe Woods, all of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Division of Ser. No. 665,999, March 11, 1976, which is a division of Ser. No. 559,204, March 17, 1975, Pat. No. 4,024,483. This application Feb. 2, 1977, Ser. No. 765,038
Int. Cl.[2] H01F *41/00*
U.S. Cl. 29—593 1 Claim

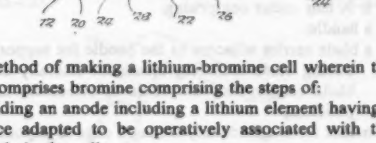
1. A method of calibrating a vacuum-servo-actuated variable inductance transducer during assembly thereof, said transducer being of the type comprising a vacuum servo having a diaphragm which is positionable according to the intensity of a vacuum signal applied to the servo, an inductance coil, a core movable axially of the coil to vary the inductance thereof, and a pair of telescopically engaged connecting members, one of which is affixed to the core and the other of which is affixed to the diaphragm, said method comprising:
providing said servo, core, and coil in assembled relationship but with said two telescopically engaged connecting members relatively movable with respect to each other so that their mutual telescopic engagement may be set to a desired amount;
providing tool access opening means in said servo;
providing a given vacuum signal to the servo;
positioning the core relative to the diaphragm, and in so doing setting the amount of telescopic engagement of said two connecting members, to obtain a desired inductance of the coil for the given vacuum signal;
and inserting assembly tool means through said access opening means and uniting the two connecting members in fixed telescopic engagement with each other by means of said tool means.



4,058,889
METHOD OF MAKING A LITHIUM-BROMINE CELL

Wilson Greatbatch, Clarence; Ralph T. Mead, Kenmore; Robert L. McLean, Clarence; Frank W. Rudolph, Depew, and Norbert W. Frenz, North Tonawanda, all of N.Y., assignors to Eleanor & Wilson Greatbatch Foundation, Akron, N.Y.

Division of Ser. No. 617,280, Sept. 29, 1975, Pat. No. 3,994,747. This application July 26, 1976, Ser. No. 708,362
Int. Cl.[2] H01M *6/00*
U.S. Cl. 29—623.5 4 Claims



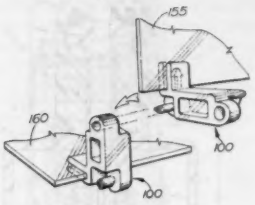
1. A method of making a lithium-bromine cell wherein the cathode comprises bromine comprising the steps of:
a. providing an anode including a lithium element having a surface adapted to be operatively associated with the cathode in the cell;
b. applying a coating to said anode surface, said coating including an organic electron donor material; and
c. introducing a cathode comprising bromine into operative contact with the coated surface of said anode in a housing to form a solid electrolyte comprising solid lithium-bromide.

4,058,890

METHOD FOR MOUNTING PRINTED CIRCUIT BOARDS

Perry H. Pierce, and Dan L. Prendergast, both of Loveland, Colo., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Oct. 15, 1975, Ser. No. 622,792
Int. Cl.[2] H05K *3/36*
U.S. Cl. 29—625 4 Claims



1. A method of mounting a plurality of printed circuit boards, the method comprising the steps of:

providing at least one slot in each of said printed circuit boards;

providing hinges having two lateral extensions which are essentially parallel planar structures having force-fitting means therebetween, said force-fitting means comprising an essentially arrow-shaped structure for force-fitting into said slot in one of said printed circuit boards;

attaching said hinges to said plurality of printed circuit boards; and

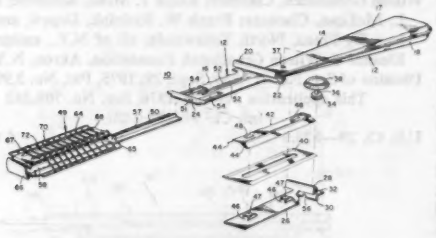
interlocking the hinges together to form a stack of printed circuit boards.

4,058,891

HAIR CUTTERS

Abram N. Spanel, 344 Stockton St., Princeton, N.J. 08540

Continuation of Ser. No. 484,566, July 1, 1974, Pat. No. 3,996,663. This application Dec. 13, 1976, Ser. No. 750,247
Int. Cl.[2] B26B *21/12*
U.S. Cl. 30—30 3 Claims



1. A hair cutter comprising:

a handle;

a blade carrier adjacent to the handle for supporting a hair cutting blade including means for laterally driving said blade carrier and said blade to selectable hair cutting positions;

means for longitudinally sliding a cage to expose said blade including an extension receivable in said handle;

a first portion of interlocking structure on said extension;

a second portion of interlocking structure on said blade carrier; and

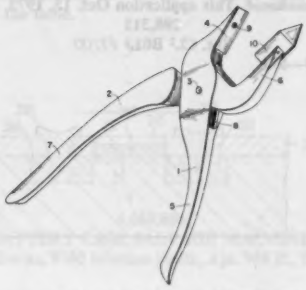
a notch on said blade carrier wherein said blade carrier can be adjusted to permit passage of said first portion of interlocking structure through said notch.

4,058,892

FOOD DECORATING INSTRUMENT

Edward W. Adamko, Brooklyn, N.Y., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Nov. 1, 1976, Ser. No. 737,592
Int. Cl.[2] B26B *17/04*
U.S. Cl. 30—178 1 Claim



1. A food decorating instrument for cutting pieces of fruit, vegetables, and the like, in a predetermined pattern, said food decorating instrument comprising

first and second arms pivotally affixed to each other by a pivot pin in the manner of a pair of pliers, each of said arms having a jaw end in the area of the pivot pin and a handle end spaced from the pivot pin;

spring means mounted on the arms urging the jaw ends of the first and second arms apart;

an internally threaded bore formed in the jaw end of the first arm, said bore opening from a surface of said first arm facing the second arm and extending a predetermined distance into said first arm;

a plate-like member affixed to the jaw end of the second arm at a surface facing the first arm; and

a mold member having a base plate with spaced opposite surfaces, an externally threaded pin extending substantially perpendicularly from one of the surfaces of the base plate and a cutting edge having a predetermined pattern extending substantially perpendicularly from the opposite surface of the base plate whereby when the mold member is removably affixed to the first arm by removably threadedly coupling the pin thereof in the bore of the first arm and a slice of fruit, vegetable, and the like, is interposed between the jaw ends and manual pressure is applied to the handle ends to force the jaw ends together the cutting edge cuts out a piece of said fruit, vegetable, and the like in the predetermined pattern.

4,058,893

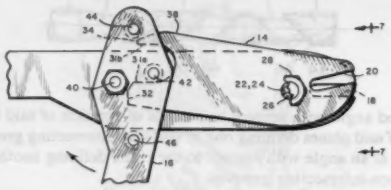
BOLT CUTTER

Alfred Z. Boyajian, P.O. Box 811, Manhattan Beach, Calif. 90268

Filed June 25, 1976, Ser. No. 699,664
Int. Cl.[2] B26B *13/26*
U.S. Cl. 30—250 8 Claims

1. A cutter comprising a rigid bar having at one end a cutting edge intermediate its opposite longitudinal edges facing in a predetermined direction, a second rigid bar having at one end a cutting edge intermediate its opposite longitudinal edges facing in a direction opposite said first cutting edge and at its other end a recess, pivot means pivotally connecting the two bars for pivotal movement relative to each other to move the cutting edges toward and from each other, means for effecting pivotal movement of the bars relative to each other from a position in which the edges are separated for receiving the part to be sheared to a position in which they overlap comprising a lever arm pivotally mounted on the first bar on a pivot spaced

from the pivot connecting the second bar to the first bar and with a portion of the lever arm situated between the pivots such as to overlap said other end of the second bar, and first and second force-producing elements fixed to the lever arm forwardly of its pivot axis at different radial distances from the pivot axis arranged to be brought into engagement with the



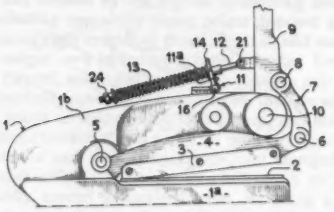
other end of the second bar at outer sides of the recess and within the recess to effect relative movement of the cutting edges toward each other at a relatively slow speed at the beginning of the blade movement to apply a high cutting pressure and thereafter a lower cutting pressure at a relatively high speed throughout the remainder of the blade movement.

4,058,894

LEVER-OPERATED SHEARS

Georges Joseph Leturgez, Loison sous Lens, France, assignor to Laminoirs Trefileries Cableries de Lens (Anciens Etablissements Gaillard-Stievenart), Lens, France

Filed May 14, 1976, Ser. No. 686,663
Claims priority, application France, May 14, 1975, 75.15024
Int. Cl.[2] B26B *13/16, 13/26*
U.S. Cl. 30—251 **6 Claims**



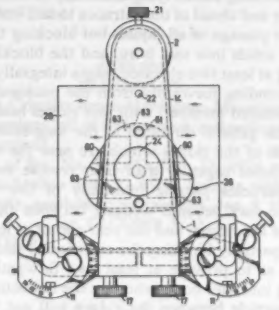
1. A lever-operated shears comprising a frame, a first jaw integral with the frame and carrying a first cutting blade, a second jaw pivotable relative to the first jaw and carrying a second cutting blade, an operating lever pivotally connected to the frame by a first pivot pin, a link for pivotally connecting said lever to said second jaw, said link being located beyond said first pivot pin with respect to said connection of said second jaw on said first jaw, said lever having a rest position, said shears further comprising a device for authomatically returning said lever to and maintaining it in said rest position, said device comprising a first member pivotally connected to said frame by means of a second pivot pin, a second member pivotally connected to said lever by means of a third pivot pin and slidably mounted through said first member on one hand and in the plane thereof, in a direction perpendicular to said second pivot pin on the other hand, said first, second and third pivot pins being parallel one to another, a first elastically yieldable means having a rotary action, and mounted between the frame and said first member, and a second elastically yieldable means having a rectilinear action and mounted on said second member between one end thereof and said first member, said first and second elastically yieldable means being capable of acting in a direction for biasing the lever to its rest position.

4,058,895

DENTAL ARTICULATOR

Heinz Mack, and Günter Singer, both of Munich, Germany, assignors to Heinz Mack, Munich, Germany

Filed Mar. 12, 1976, Ser. No. 666,395
Claims priority, application Germany, Mar. 15, 1975, 2511388; Nov. 15, 1975, 2551189
Int. Cl.[2] A61C *19/02*
U.S. Cl. 32—32 **13 Claims**



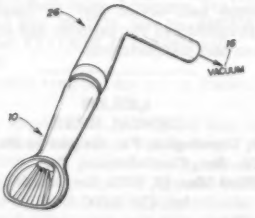
1. A dental articulator comprising a lower frame portion with means for securing a mounting plate for the lower jaw model and a supporting platform or the incisor guide pin, a vertical frame portion rigidly connected to the lower frame portion and having two balls serving as condyles which are mounted on two supporting stems, and an upper frame portion with the two radially rotatable ball sockets serving as fossae and including a rear ball guiding means, and an inner ball guiding means which is angularly adjustable relative to the rear ball guiding means, a bearing shaft, means for securing a mounting plate for the upper jaw model to said upper frame portion, and an adjustable incisor guide pin, characterized in that the inner ball guiding means which is angularly adjustable relative to the rear ball guiding means comprises an exchangeable, optionally grindable segment of a circle bearing against a circular inner wall of the ball, and a lockable slide is provided which serves to lock the ball in the corner formed by the rear ball guiding means, the angularly adjustable inner ball guiding means, and an upper ball guiding surface, said slide being arranged opposite, or diagonally opposite, the corner formed by the rear ball guiding means and the angularly adjustable inner ball guiding means such that, after locking, one end of the slide rests on the lower half of the ball.

4,058,896

DENTAL ASPIRATOR TIP

Roland E. Moore, 2700 Tibbets No. 103, Bedford, Tex. 76021

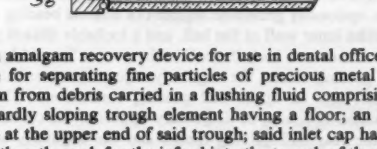
Filed Jan. 15, 1976, Ser. No. 649,211
Int. Cl.[2] A61C *17/04*
U.S. Cl. 32—33 **13 Claims**



1. An oral aspirator tip, comprising:

a. a rigid shank having a longitudinal bore adapted to be connected to a source of vacuum;
b. a firm and relatively large tissue-contacting member being generally spoon-shaped and having an open face and a closed back, and having a width appreciably larger than the diameter of the shank, with the tissue-contacting member being affixed to the forward end of the shank in such a way as to permit the passage of liquids through the open face and into the bore entrance; and
c. rigid blocking means lying internally of the spoon-shaped member and ahead of the entrance to said bore, for permitting the passage of all liquids but blocking the passage of certain solids into said bore, and the blocking means including at least two elevated ridges integrally formed with and extending forwardly from the enclosed back of the spoon-shaped member, with said ridges being oriented in the same general direction as the longitudinal bore, and the ends of the ridges which are near the bore entrance being closer together than their remote ends, such that solid particles passing internally of the spoon-shaped member may become wedged between the converging walls of the ridges, and the near end of at least one of the ridges partially blocking the entrance to said bore in such a way as to provide at least two flowpaths for liquids passing into said bore, whereby the collection of any one solid particle between the ridges will not block the entrance to the longitudinal bore.

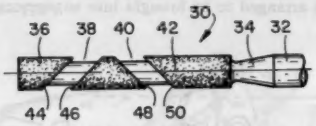
4,058,897
AMALGAM RETRIEVER
Frank E. Edwards, 5937 Birchwood Drive, Great Bend, Kans. 67530
Filed Aug. 10, 1976, Ser. No. 713,184
Int. Cl.[2] A61C *17/00*
U.S. Cl. 32—40 R **11 Claims**



1. An amalgam recovery device for use in dental offices or the like for separating fine particles of precious metal and amalgam from debris carried in a flushing fluid comprising a downwardly sloping trough element having a floor; an inlet end cap at the upper end of said trough; said inlet cap having an inlet therethrough for the infeed into the trough of the flow of flushing fluid and debris from which the particles and amalgam are to be recovered; means to divide said trough into a plurality of compartments to receive the particles and amalgam depositing out of said flow; an outlet cap at the lower end of said trough having an outlet opening therethrough to pass the flushing fluid and any debris floating therein from the trough element after the particles and amalgam have been separated therefrom; a housing element situated between said end caps for enclosing said trough element; and means to hold said housing, caps and trough elements assembled in fluid tight relation whereby said device may be disassembled to be cleaned and sterilized and the particles and amalgam may be recovered from said compartments.

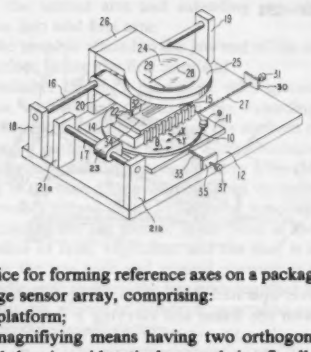
4,058,898
DENTAL BURR
John E. Nash, Downington, Pa., assignor to Star Dental Manufacturing Co., Inc., Conshohocken, Pa.
Filed Mar. 19, 1976, Ser. No. 668,334
Int. Cl.[2] A61C *3/06*
U.S. Cl. 32—59 **7 Claims**

1. A dental burr comprising a shank terminating, at the operative end thereof, in a cutting surface, said cutting surface having a plurality of non-intersecting grooves therein, said non-intersecting grooves being the only grooves in said cutting surface, each of said non-intersecting grooves being defined by a plane which completely encircles said cutting surface at a



skewed angle with respect to the axis of rotation of said burr, one of said planes defining one of said non-intersecting grooves being at an angle with respect to the plane defining another of said non-intersecting grooves.

4,058,899
DEVICE FOR FORMING REFERENCE AXES ON AN IMAGE SENSOR ARRAY PACKAGE
William S. Phy, Los Altos, Calif., assignor to Fairchild Camera and Instrument Corporation, Mountain View, Calif.
Filed Aug. 23, 1976, Ser. No. 716,915
Int. Cl.[2] B43L *11/00*
U.S. Cl. 33—26 **2 Claims**



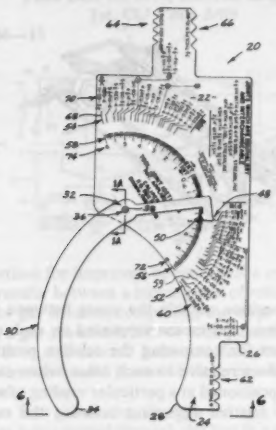
1. A device for forming reference axes on a package containing an image sensor array, comprising:
a stable platform;
optical magnifiying means having two orthogonal reticles formed therein, said optical means being fixedly attached to said stable platform in a plane parallel to the plane of said platform;
a first table movably mounted on said stable platform, said first table having means to produce movement in two linear mutually orthogonal directions, said directions being parallel to said orthogonal reticles, said first table being mounted in a plane parallel to the plane of said platform;
a second able rotatably mounted on said first table, said second table being mounted in a plane parallel to the plane of said platform, said second table being adapted to receive said image sensor array;
first and second guide means mounted on said stable platform, said guide means being parallel to said orthogonal reticles; and,
first and second scribe means slidably mounted on respective ones of said guide means projecting from said guide means for overlying said second table for inscription of orthogonal reference axes on an image sensor array.

4,058,900

INSIDE AND OUTSIDE CALIPER AND TOOL-JOINT IDENTIFIER

James L. Yandell, 706 Shenandoah, Conroe, Tex. 77302

Filed Mar. 1, 1976, Ser. No. 662,865
Int. Cl.[2] G01B 5/08, 5/12
U.S. Cl. 33—148 E 1 Claim



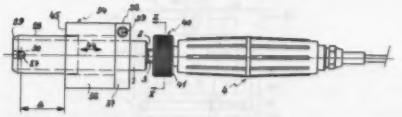
1. A tool joint caliper and identifier comprising a first caliper arm, a second caliper arm, pivotal connecting means adjacent to one end of said arms, the other end of each of said arms including a contact point for engagement with a pin or box tool joint, said one end of said second caliper arm including an extension having a pointer thereon movable in a circular path about an axis defined by the pivotal connecting means, said pointer including oppositely facing points disposed along angularly spaced radii extending from said axis, said one end of said first caliper arm including a panel member forming an extension thereof, said panel member including a pair of arcuate, concentrically spaced graduated scales thereon associated with said points on said second caliper arm, and indicia disposed adjacent to each of said scales for respectively indicating the diameter of and identifying a tool joint engaged by the contact points to facilitate making up a drill string, each of said concentrically spaced graduated scales including a pair of arcuate scales spaced circumferentially along the arc of movement of the pointer, the inner of the concentrically spaced scales being associated with the radially inward point with the inner pair of arcuate scales and indicia associated therewith designating the internal diameter of a box tool joint or the external diameter of a pin tool joint engaged by said contact points, the outer point and outer pair of arcuate scales and indicia associated therewith identifying a box tool joint or a pin tool joint engaged by said contact points, said second caliper arm being in the form of an arcuate member with the contact point being at the outer end of the concave edge thereof, said first caliper arm including a concave arcuate edge having a contact point at the outer end thereof, said contact points engaging opposite external surfaces of a pin tool joint when disposed in spaced opposed relation, said caliper arms being disposed in two separate planes to enable the contact points to cross over and engage opposite internal surfaces of a box tool joint, said pivotal connecting means being located at the end of the arms remote from the contact points, the end of the panel member having the concave edge and contact point including a notch in the edge thereof adjacent the contact point to reduce the overall width of the end of the panel member having the contact point thereon to facilitate insertion into box joints having a relatively small internal diameter, said notch including an outwardly facing edge provided with thread-shaped recesses therein to serve as a thread gauge with the inner edge of the notch serving as a limit for the longitudinal movement of the end of the panel member in relation to a tool joint, said panel member including an end edge remote from the contact point at the outer end of the concave outer edge, an extension on said end edge of substantially less width than the end edge to facilitate manipulation of the panel member, said extension including thread-shaped recesses in each longitudinal edge thereof forming thread gauges with the adjacent edge portions of the panel member at the inner end of the extension defining means limiting the longitudinal movement of the extension in relation to a tool joint.

4,058,901

PLUG GAGE

Georges Lendi, Crissier; Bruno Hardegger, Monaltorf, and René De Trey, Bussigny, all of Switzerland, assignors to Tesa S.A., Vaud, Switzerland

Continuation of Ser. No. 531,663, Dec. 11, 1974, abandoned.
This application June 22, 1976, Ser. No. 698,770
Claims priority, application Switzerland, Jan. 9, 1974, 219/74
Int. Cl.[2] G01B 5/12
U.S. Cl. 33—178 R 9 Claims



1. A plug gauge comprising:
a. a tubular body;
b. a rod housed in said body, said rod axially movable within said tubular body;
c. a conical element mounted on one end of said rod, coaxially thereto;
d. said tubular body formed with at least two guide channels, said guide channels transverse to the longitudinal axis of said tubular body;
e. a radially movable feeler ball housed in each of said guide channels, said feeler balls resting against the side surface of said conical element;
f. wall means integral with said tubular body to retain said feeler balls within said guide channels; and
g. coaxial centering sleeve means detachably engaged over said tubular body and said wall means to surround said tubular body over at least a portion of the length thereof, said sleeve means provided with transverse openings to permit passage of said feeler balls, whereby said centering sleeve means may be removed and replaced by another centering sleeve means detachably engaged over said tubular body and said wall means to surround said tubular body over at least a portion of the length thereof and provided with transverse openings to permit passage of said feeler balls.

4,058,902

DOOR HINGE TEMPLATE

Roy W. Hall, 1813 Beth Drive, Longview, Tex. 75601

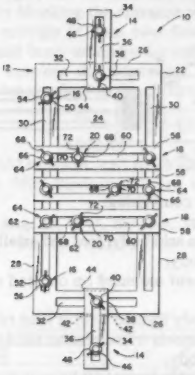
Filed Dec. 30, 1975, Ser. No. 645,375
Int. Cl.[2] G01B 3/00; E06B 3/00
U.S. Cl. 33—189 5 Claims

1. A hole locating template for use on frames and the like and comprising:
a substantially symmetrical, rectangular base member having at least one planar face, and having a central, elongated opening, and peripheral opposite longitudinally extending sides and peripheral opposite transversely extending ends that are mutually perpendicular to and integral with said sides, each said side and each said end having an elongated central opening defined by parallel edge elements such that each said peripheral side and end

central opening extends parallel to the corresponding edge of said base member;

first locating means for locating a point in the longitudinal direction and comprising first and second elongated frames, each frame slidably mountable at one end thereof for movement in a transverse direction at a corresponding end of said base plate in the end central opening thereof and having at least one depending boss integral with said frame for engagement with one of said transverse edges of the corresponding said peripheral end for maintaining said frame substantially perpendicular to said peripheral end; means for removably, rigidly attaching said one end of each said frames through said end central opening of the corresponding peripheral end; and a first alignment means for each said frame which comprises an elongate first element adjustably, rigidly mountable to the other end of said frame such that said first element extends substantially perpendicular to said planar face of said base member;

second locating means for locating a point in the transverse direction, said second locating means comprising an elongate, second alignment means for gauging transverse distance from one of said longitudinal sides of said frame, said second alignment means comprising an elongate, second element extending substantially perpendicular to said planar face of said base member, means for slidably mounting said second element in said peripheral side central opening perpendicularly to said face of said base member and for removably rigidly attaching said second element to said peripheral side;



at least one elongated adjustable member extending transversely across said base member central opening and slidably mounted at each end thereof to the corresponding base member side; and

adjustable indicating member mounted on said adjustable member for indicating within said base member central opening the desired location of the hole, said indicating member comprising an elongate marking pointer having a pointed one end and means for removably, rigidly attaching said pointer at the other end to said adjustable member such that said pointer extends substantially perpendicular to said planar face of said base member.

4,058,903

WHEEL BASE, TRACKING AND FRAME ANALYZER

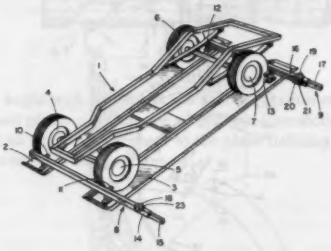
Edward D. Wilkerson, P.O. Box 755 South Court, Normandy Beach, N.J. 08739

Filed Jan. 15, 1976, Ser. No. 649,473

Int. Cl.[2] G01B *5/255, 11/275*

U.S. Cl. 33—288 **12 Claims**

12. A frame analyzer for a four wheel and tire vehicle of the tracking type, comprising; a pair of gauges each having a pair of telescopic elements, a wheel engaging member attached to each of the telescopic elements adapted to extend approximately the width of each set of wheels, said elements having portions extending outside the space between the wheel engaging members, an indicia scale carried by each telescopic element with one element having ascending indicia juxtaposing descending indicia on the other element, an adjustable member slideable on one of the telescopic elements of each gauge and



movable to a position outside the space between the wheel engaging members, and means supported on each of said adjustable members for comparing the relative position of the adjustable members relative to each other when each adjustable member is positioned at a particular reading of said indicia to indicate the relative alignment between the two sets of wheels.

4,058,904

PROCESS FOR DRYING WET PARTICLES OF HYDROLYZED ETHYLENE-VINYL ACETATE COPOLYMER

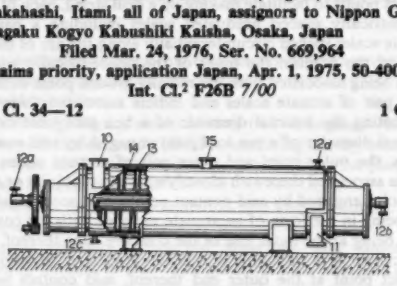
Hiroshi Takida, Takatsuki; Akio Kido, Ogaki, and Masazumi Takahashi, Itami, all of Japan, assignors to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Mar. 24, 1976, Ser. No. 669,964

Claims priority, application Japan, Apr. 1, 1975, 50-40020

Int. Cl.[2] F26B *7/00*

U.S. Cl. 34—12 **1 Claim**



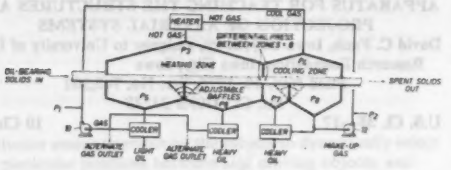
1. In a process for drying wet particles of hydrolyzed ethylene-vinyl acetate copolymer having an ethylene content of 20 to 50% by mole, a vinyl acetate content of 80 to 50% by mole and a degree of hydrolysis in vinyl acetate component of at least 90% by mole obtained by hydrolyzing ethylene-vinyl acetate copolymer in a medium, the improvement which comprises carrying out the drying under a pressure in a dryer of up to 120 mmHg, a temperature of the heating surface of the dryer of up to 100° C., and such that $T \times \theta^{0.6} \leqq 320$ wherein T is a temperature (°C.) of the heating surface and θ is a residence time of the particles in the dryer.

4,058,905

METHOD FOR REDUCING RESIDENCE TIME AND ELIMINATING GAS LEAKAGE BETWEEN ZONES IN A CROSS-FLOW DEVICE FOR HEATING AND COOLING SOLIDS

John H. Knight, Aurora, Colo., assignor to The Superior Oil Company, Houston, Tex.

Filed Dec. 19, 1974, Ser. No. 534,461
Int. Cl.[2] F26B *3/06*
U.S. Cl. 34—15 8 Claims



1. A method for improved operation of a cross-flow device for heat transfer between a moving bed of solid particles and a plurality of gas streams, comprising the steps of:

moving a gas-permeable bed of solid particles through adjacent first and second heat transfer zones wherein the particles are heated in one of the zones and cooled in the adjacent zone;

passing a first gas stream through the bed in the first zone, the gas being passed through the bed in a direction normal to the direction of movement of the bed to achieve a first heat transfer between the particles and the first gas stream;

passing a second gas stream through the bed in the second zone, the second gas stream being passed through the bed in the same direction as the first gas stream, and

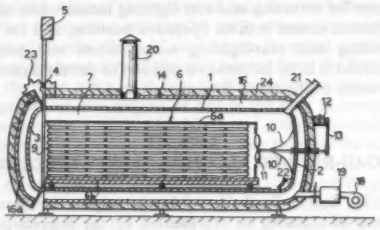
maintaining the first and second gas streams at the same inlet and outlet pressures respectively to reduce the lateral gas flow through the bed between the first and second heat transfer zones.

4,058,906

PROCESS FOR DRYING LARGE PIECES OF WOOD AT SUBATMOSPHERIC PRESSURE OR IN VACUO, PARTICULARLY FOR DRYING DELICATE WOOD AND/OR WOOD WHICH IS EASILY SPLIT

Vincenzo Pagnozzi, Rocchetta di Cairo (Savona), Italy, assignor to Ernesto Guglielmo Pagnozzi, Cairo Montenotte (Savona), Italy

Filed May 18, 1976, Ser. No. 687,495
Claims priority, application Italy, May 19, 1975, 68291/75
Int. Cl.[2] F26B *5/04*
U.S. Cl. 34—16.5 11 Claims



1. A process of drying large pieces of wood comprising a step of heating a drying gas and a pile of said pieces of wood in a sealed container to accumulate heat in the wood under inherently increasing pressure of said gas, followed by a step of connecting the container to a vacuum source to produce evaporation of moisture from the wood by the heat accumulated in the latter,

wherein the heating step comprises:

circulating within said sealed container the said gas in humid condition in a closed circuit such that at every turn the gas is compelled to pass through the pile and then return along a distinct path which does not pass through the pile and is in heat-exchange relation with the walls of the container,

heating the container as a whole from the outside to heat said gas on its return path by inflow of heat from the walls of the container to the gas, whereby the thermal content of the gas increases at each subsequent turn by a diminishing amount until the gas reaches a substantially steady state at which there is no overall increase of its thermal content at each subsequent turn while at the same time the absolute humidity of the gas remains substantially constant, both on passage through the pile and on return, and

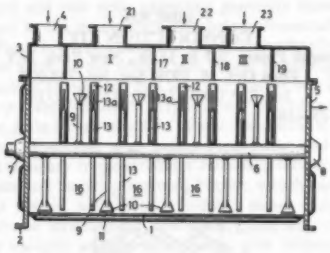
continuing the circulating and heating of the humid gas under said steady state conditions until the temperature drop of the gas between its entrance to and exit from the pile is less than 3° C.

4,058,907

DEVICE FOR THE HEAT TREATMENT OF BULK MATERIAL

Eberhard Lipp, Paderborn, and Hans-Hermann Jurgens, Schloss Neuhaus, both of Germany, assignors to Firma Gebr. Lodige Maschinenbau-Gesellschaft mbH, Paderborn, Germany

Filed Oct. 22, 1975, Ser. No. 625,010
Claims priority, application Germany, Nov. 15, 1974, 2454208
Int. Cl.[2] F26B *17/20*
U.S. Cl. 34—61 14 Claims



1. Apparatus for the heat treatment of bulk material, comprising: a generally horizontally extending trough-shaped container; a driven shaft extending longitudinally through and being mounted for rotation with respect to said container; a plurality of arms operatively secured to and extending generally radially outwardly from said shaft for rotation therewith, said arms having means for mixing bulk material within said container; a plurality of separate heat exchanger plates positioned within said container between said radially extending arms, and means mounted on side walls of said container for mounting each of said plates so that each plate is individually removable independently of each other and of said shaft, the cross-sectional configuration of said heat exchanger plates generally conforming to the internal configuration of said trough-shaped container, with each plate being formed with cutouts aligned with interfering parts within said container, including said shaft.

4,058,908

APPARATUS FOR DRYING FLAT PRINTED MATERIAL

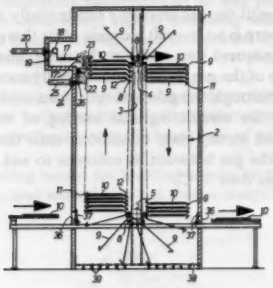
Erich Weber, 9a, Bertha Koempelstrasse, Feldafing, Germany

Division of Ser. No. 472,461, May 22, 1974, abandoned. This application May 13, 1976, Ser. No. 686,102

Claims priority, application Germany, May 22, 1973, 2326012; May 9, 1974, 2422492

Int. Cl.[2] F26B *15/22*

U.S. Cl. 34—149 19 Claims



1. Apparatus for drying flat printed material such as paper and card sheets, plastic film or panels of board, timber, sheet metal or other material with printed material supports mounted on chain links connected to conveyor chains provided on a substantially upright chain conveyor means defining rising and falling conveyer stringers, an upper portion of said chain conveyor means provides a transfer path for said material wherein the material is transferred laterally from a rising conveyer stringer to a falling conveyer stringer, said transfer path including conveying means which comprise pull elements which can be reciprocated in the conveying plane for acting on the leading ends of the printed material so as to pull the printed material over the conveying path from said rising to said falling conveyer stringer.

4,058,909

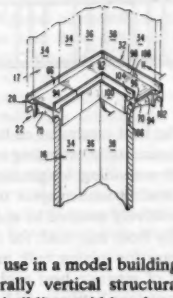
CONSTRUCTION KIT

Victor Joseph Poleri, 207 E. 15 St., New York, N.Y. 10003

Filed Oct. 18, 1976, Ser. No. 733,097

Int. Cl.[2] G09B *19/00*; A63H *33/10*

U.S. Cl. 35—16 16 Claims



1. A bracket for use in a model building to create a supporting ledge in generally vertical structural walls forming the outer shell of said building, said bracket comprising:

a generally horizontal main wall having bounding inner and outer edges and lateral edges each extending between said inner and outer edges;

means disposed at, at least, one of said inner and outer edges for securing said bracket at the top of a fist of said structural walls; and

means disposed at, at least, the other of said inner and outer edges for supporting a second of said structural walls, said supporting means being constructed and arranged to receive the bottom of said second structural wall;

said supporting ledge being formed by securing a plurality of said brackets to the top of said first structural wall with lateral edges of adjacent brackets abutted and with the outer and inner edges of each bracket aligned with at least a portion of the corresponding edge of each bracket adjacent thereto.

4,058,910

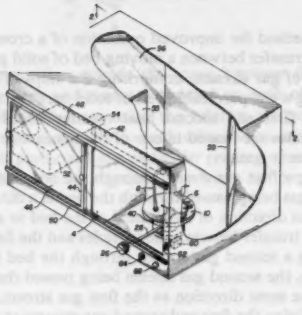
APPARATUS FOR TEACHING THE STRUCTURES AND PROJECTION OF ARTERIAL SYSTEMS

David C. Funk, Iowa City, Iowa, assignor to University of Iowa Research Foundation, Iowa City, Iowa

Filed Nov. 18, 1976, Ser. No. 743,202

Int. Cl.[2] G09B *23/28*

U.S. Cl. 35—17 10 Claims



1. Apparatus for teaching the structures and projections of arterial system in preparation for making and studying arteriograms, said apparatus comprising,

a substantially closed housing having an observation opening,

a three dimensional model of an arterial system located in said housing at a position which is visible through said observation opening,

a rear-lighted projection screen movable from an inoperative position removed from said observation opening to an operative position which lies across said observation opening,

rear-lighting means in said housing for directing a beam of light first against said model and then against said projection screen when said projection screen is in its operative position, to cast a two dimensional shadow of said model on said projection screen,

means for actuating said rear-lighting means when said projection screen is in its operative position, and for deactivating said rear-lighting means when said projection screen is in its inoperative position to permit direct observation of the three dimensional model.

4,058,911

ROAD-RUNNER ALCOHOL SAFETY INTERLOCK SYSTEM

Anne W. Story, Cambridge, Mass., assignor to The United States of America as represented by the Secretary of the Department of Transportation, Washington, D.C.

Filed Aug. 18, 1976, Ser. No. 715,424

Int. Cl.[2] G09B *19/00*

U.S. Cl. 35—22 R 7 Claims

1. An intoxication testing apparatus comprising:

display means for producing a display visible to a test subject;

first test means for producing a first moving object in said display;

second test means for producing a second moving object in said display;

computer means for dynamically determining the changing locations of the midpoint of given positions between said moving objects and having a constant spatial relationship thereto;

actuator means operable by the subject to dynamically select particular positions between said moving objects; and

comparator means for dynamically comparing the locations of said given and particular positions.

4,058,912

DIDACTIC APPARATUS

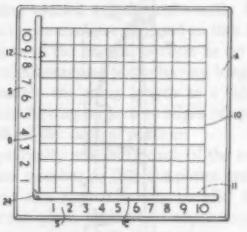
Charles Arthur Tacey, Andover, England, assignor to Philograph Publications Limited, England

Filed Feb. 18, 1976, Ser. No. 658,966

Claims priority, application United Kingdom, Feb. 19, 1975, 7028/75

Int. Cl.² G09B *23/04*

U.S. Cl. 35—34 **1 Claim**



1. Didactic apparatus for the purpose specified, and for use with lcm. unit cubes, comprising:

i. a rectangular base plate having an upper face marked with a grid defining lcm. squares, said grid having its boundaries spaced by a first edge portion from a first edge of the base plate, and by a second edge portion from a second adjoining edge of the base plate, said base including slots,

ii. a first transparent rectangular wall mounted on said base normal to the plane of said upper face and positioned along the boundary of the grid spaced from the first edge of the base plate, said first wall including a tongue for engagement in a respective slot of the base to locate and connect the wall to the base, said tongue including a shoulder for abutment against the base to retain the tongue in engagement in said slot,

iii. a second transparent rectangular wall mounted on said base plate normal to the plane of said upper face and positioned along the boundary of the grid spaced from the second edge of the base plate, said second wall being joined at a right angle to said first wall, said second wall including a tongue for engagement in a respective slot of the base to locate and connect said wall to the base, said tongue including a shoulder for abutment against the base to retain the tongue in engagement in said slot, one of said first and second walls includng a T-piece tenon formation remote from the base and the other of said first and second walls including a corresponding recess formation remote from the base for interengegement to connect said first and second walls together, said first and second walls being marked with grid lines defining lcm. squares commencing from the line of juncture of the walls with the base plate, and the line of junctureof the walls with each other, the grid lines of the base plate being numbered consecutively on said edge portions starting from the juncture of said walls, and the horizontal grid lines marked on said walls being numbered consecutively starting from the juncture of each wall with the base.

4,058,913

LIGHTWEIGHT TRAIL GROOMER

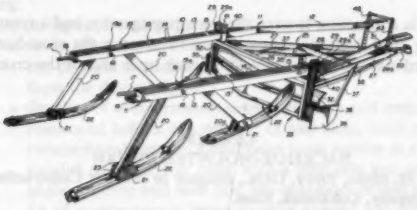
Georges Esquilat, Valcourt, Canada, assignor to Bombardier Limited, Canada

Filed Mar. 29, 1976, Ser. No. 671,036

Claims priority, application Canada, Jan. 2, 1976, 242919

Int. Cl.² E01H *5/06*; A01B *15/10*

U.S. Cl. 37—50 **9 Claims**



1. A trail groomer comprising an elongate generally horizontal frame, means at a forward end of the frame for attachment to a towing vehicle, a transverse scraper blade positioned beneath the frame at an intermediate location in the length thereof, said frame having a rear end supported on ski means for sliding engagement with a snow surface, said ski means comprising a pair of laterally spaced brackets each of which has an intermediate portion pivoted on a common transverse axis at the rear of the frame and each having longitudinally spaced front and rear arms extending generally downwardly with respect to the frame, each arm being connected to a ski such that the skis are positioned in pairs longitudinally aligned at opposite sides of the frame, said frame including a main frame structure supporting said laterally spaced brackets, and an auxiliary frame structure pivoted on a second transverse axis on the main frame structure at said intermediate location and having dependent arm means supporting said scraper blade, said auxiliary frame structure extending forwardly from said location and having a forward portion which carries said attachment means, adjustable connector means linking said auxiliary frame structure to said main frame structure at a selectively variable angular relationship with respect to said second transverse axis whereby in use to provide means to vary the height of said scraper blade with respect to a snow surface upon which the trail groomer is to be towed.

4,058,914

ALTERNATE FLOW SUCTION DREDGE

Sandor G. Kiss, 236 E. Sunset Ave., Lombard, Ill. 60148

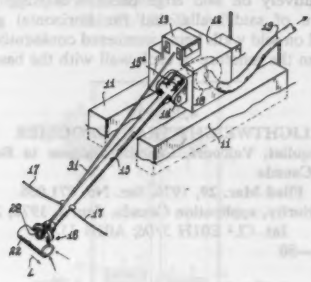
Filed Dec. 15, 1975, Ser. No. 640,395

Int. Cl.² E02F *3/92*

U.S. Cl. 37—66 **9 Claims**

1. In a hydraulic suction dredge, the combination of a suction tube ladder, a suction motor in said dredge, a suction head, said suction head having a neck at one end connected to said suction tube ladder and a tubular cross-head on the other end, said cross-head having an unrestricted opening at each end, a wall separating the cross-head from the neck, a central partition dividing said cross-head into two portions, passageways in said wall, one connecting each portion with the neck, an oscil-

latably rotatable T-shaped gate valve in said neck to manually selectively close either one of said passageways, said suction tube ladder and said cross-head converting suction developed by the suction motor into a linear force propelling the cross-



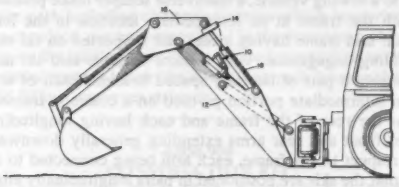
head in a direction toward the open passageway, and a rotary cutter head, including augur means to advance the cross-head toward a work area, arranged on each open end of the cross-head.

4,058,915

BACKHOE-MOUNTED SHEAR

Leon M. Hake, Perry, Okla., assignor to Wittwer Construction Company, Oskaloosa, Kans.

Filed June 8, 1976, Ser. No. 693,743
Int. Cl.[2] B26D *7/00*; E02F *3/76*
U.S. Cl. 37—117.5 **8 Claims**



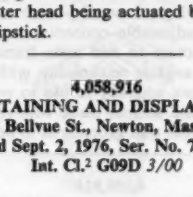
1. A shearing apparatus, comprising, in combination:
a. a shear having a cutting head; and
b. a backhoe having a backhoe dipstick on a backhoe boom, said shear being mounted on one of said boom and dipstick and said cutter head being actuated by the other of said boom and dipstick.

4,058,916

OBJECT RETAINING AND DISPLAY CALENDAR

Roy Whyatt, 105 Bellvue St., Newton, Mass. 02158

Filed Sept. 2, 1976, Ser. No. 719,941
Int. Cl.[2] G09D *3/00*
U.S. Cl. 40—107 **7 Claims**



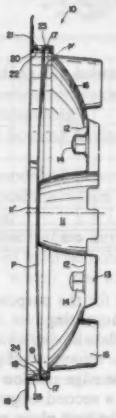
1. An object retaining and display calendar comprising:
a back support member;
a plurality of parallel dividers, sloped downward to the horizontal, affixed to said back support member to form a plurality of parallel channels each having an upper and lower end;
a plurality of date areas associated with calendar indicia in sequential order, arranged in a plurality of parallel rows sloped downward to the horizontal, each of said rows proximately and correspondingly positioned in relation to one of said channels, said date areas being in an overlying relationship to said back support member;
means for blocking the lower end of said channels; and
a substantially transparent front support member affixed at its top and bottom in a face-to-face relationship with said back support member, said channel dividers and said channel end blocking means interposed therebetween.

4,058,917

WHEEL DISK DISPLAY AND PLACARD HOLDER

James I. Tallon, Cuyahoga Falls, Ohio, assignor to McNeil Corporation, Akron, Ohio

Filed Nov. 3, 1975, Ser. No. 628,548
Int. Cl.[2] G09F *7/00*
U.S. Cl. 40—125 M **9 Claims**



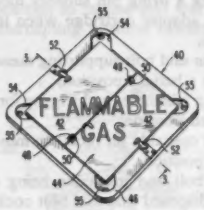
7. A wheel disk for mounting on a pneumatic tire for display purposes and adapted to selectively retain a generally flat placard comprising, disk like surface means curving generally radially and axially outwardly, circumferential flange means positioned radially outwardly of said surface, retaining means on said circumferential flange means to restrain the placard from axially outward travel after its insertion into the confines of said circumferential flange means, said retaining means being circumferentially spaced lugs each having a substantially radial stop leg to limit the axially outward travel of a placard when positioned in said circumferential flange means in the wheel disk and having an axially and radially inwardly tapered surface extending from said circumferential flange means to said stop leg to facilitate the insertion of the placard in the wheel disk, and lateral offset means interposed between said circumferential flange means and said surface means and spaced from said retaining means to limit the axially inward travel of the placard when positioned in the wheel disk.

4,058,918

VEHICLE PLACARDING APPARATUS

Harry Fund, Chicago, Ill., assignor to Modular Products Corporations (Labelmaster Division), Chicago, Ill.

Filed Aug. 16, 1976, Ser. No. 714,840
Int. Cl.[2] G09F *21/04*
U.S. Cl. 40—129 C 2 Claims



1. An apparatus for placarding a vehicle with a plurality of selectively exposable inscriptions on diamond-shaped backgrounds comprising:

a base member comprising an equilateral, diamond-shaped central portion and a framing section raised from the square central portion and lying along substantially the entire perimeter of the central portion of the base member, said base member being attachable to the vehicle so that the framing section extends outwardly from the vehicle and from the central portion, and so that diagonally opposite vertices of the central portion lie on a vertical axis;

a plurality of rectangular plates having longitudinal edges of approximately the same length as a side of the central portion and having transverse edges of approximately half the length of the central portion;

means for pivotally attaching each of the rectangular plates to the base member so that the plates are pivotable about a common axis approximately parallel to a longitudinal edge of each plate, which axis approximately bisects two parallel sides of said framing section;

manually operable means mounted on the other two sides of said framing section for clipping the rectangular plates to the base member to selectively retain the plates in parallel contact with the central portion;

said plates being located and having indicia so that the surfaces of any two of the plates facing outwardly simultaneously collectively define a diamond-shaped area displaying an inscription, split along the common pivoting axis and framed by the framing section; and,

said framing section being raised from the central portion a sufficient amount so that the plurality rectangular plates lay in the recess formed by said framing section and are thereby protected from being moved and damaged by stationary projections along the path of the vehicle which would otherwise catch edges of the rectangular plates as the vehicle is driven by the stationary projections

cutouts are formed in the framing section about the vertices of the central portion to provide access for selection and manual grasping of the rectangular plates; and, said framing section comprises:

wall portions projecting perpendicularly to the central portion and located about the perimeter of the central portions; a frame wall portion attached to the wall portion and disposed in a plane parallel to the plane of the central portion; and

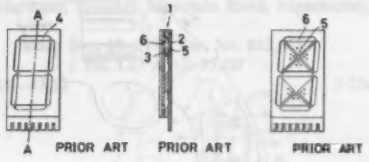
a frame skirt portion depending from said frame.

4,058,919

SEGMENT TYPE, ELECTRIC LIGHT ALPHA-NUMERIC FIGURE INDICATOR

Yasuo Wakabayashi, 17-7, Hisaki 8-chome, Zushi, Kanagawa, Japan

Filed Oct. 29, 1976, Ser. No. 737,005
Int. Cl.[2] G09F *13/00*
U.S. Cl. 40—130 E 4 Claims



1. A segment type, electric light figure indicator, comprising:

a casing for housing the indicator.

a cover plate disposed over said casing and having a plurality of light-transmissive slots arranged to collectively form the desired figure;

a plurality of compartments disposed within said casing and positioned behind at least one of said slots, each of said compartments having a triangular cross section in a plane parallel to said cover plate with a base side and an apex angle opposite said base side, the base sides of said plurality of compartments being linearly aligned and coextensive with said one slot;

each of said compartments having a reflecting wall inclined to said cover plate at an angle of about 15° to 75° and being disposed immediately behind said one slot; and

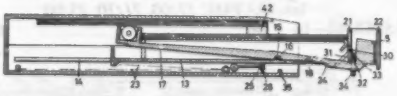
at least one light source housed in each of said compartments and positioned adjacent to the apex angle.

4,058,920

TELEPHONE NUMBER REGISTER

Reinhold Moltrecht, Klosterbergenstrasse 20a, 2057 Reinbek, Germany

Filed June 11, 1976, Ser. No. 694,941
Claims priority, application Germany, July 5, 1975, 2530106; Sept. 20, 1975, 2542046
Int. Cl.[2] H04M *1/04;* A47B *88/00*
U.S. Cl. 40—336 11 Claims



1. In combination with a telephone number register having a shallow casing,

a drawer guidedly operative therein for supporting register cards and adapted for moving out of the front side of said casing, and

a plurality of double levers supported on the drawer, each supporting on its rear end a projection selector for raising those registered cards associated therewith when the respective front lever end thereof is lowered,

the improvement in each of said levers comprising:

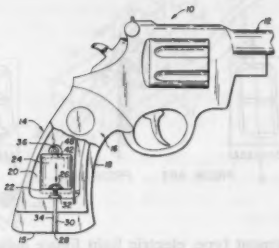
locking means for holding said front lever end lowered upon actuation, and

releasing means connected to at least one of said drawer and casing for releasing said locking means upon insertion of said drawer.

4,058,921
PISTOL ADAPTED FOR DISPENSING DEBILITATING CHEMICAL REPELLANTS

Neil E. Mason, 36004 Salisbury Drive, Newark, Calif. 94560

Filed Jan. 21, 1977, Ser. No. 761,104
Int. Cl.[2] F41C *27/00*
U.S. Cl. 42—1 G 9 Claims



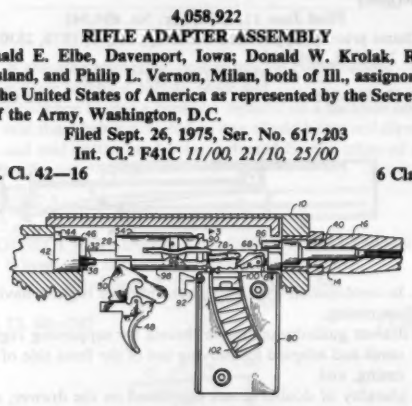
1. A combination weapon comprising a pistol having a barrel and a shank with a butt end, a cylindrical cannister containing a pressurized debilitating chemical substance mounted in said shank, a valve for releasing said chemical substance, a digitally operable actuator for operating said valve, and a nozzle coupled to said cannister and mounted in the butt end of said shank transversely to the barrel for directing said chemical substance transverse to said barrel.

8. A kit for modifying a firearm to additionally discharge a disabling chemical, said firearm having a barrel and a generally hollow shank with a butt end with a pair of hand grips enclosing said hollow shank to form a cavity, said kit comprising a cannister adapted to fit within said cavity, valve means mounted to said cannister for releasing said chemical, actuator means for operating said valve means in response to digital compression of a firearm gripping hand, and a nozzle mountable in said butt end to direct a discharge of said chemical from said butt end in an ostensibly non-threatening and safe direction transverse of said barrel.

4,058,922
RIFLE ADAPTER ASSEMBLY

Ronald E. Elbe, Davenport, Iowa; Donald W. Krolak, Rock Island, and Philip L. Vernon, Milan, both of Ill., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sept. 26, 1975, Ser. No. 617,203
Int. Cl.[2] F41C *11/00, 21/10, 25/00*
U.S. Cl. 42—16 6 Claims



1. A rifle adapter system for converting a rifle having a rifle receiver to fire ammunition other than for which it was designed to fire, said adapter system comprising:

an adapter magazine attachable to said rifle for conveying adapter cartridges to said rifle receiver, said magazine having feed lips extending approximately the length of an adapter cartridge and an angularly disposed integral ramp extending forwardly therefrom, with side guides adjacent said ramp to guide said adapter cartridges when moved forwardly to battery position,

an assembly having a rear retainer and forward adapter chamber held in fixed spaced relationship by a bolt supporting means,

a bolt slidably moveable along said supporting means and between said retainer and said adapter chamber,

said bolt having means thereon for moving an adapter cartridge into said chamber and extract the casing after said adapter cartridge has been fired,

said bolt having a firing pin slidably mounted thereon for striking said adapter cartridge when in said chamber to fire the same,

spring means on said bolt supporting means urging said bolt forwardly to a battery position,

said rifle having a hammer and trigger for searing said hammer in cocked position,

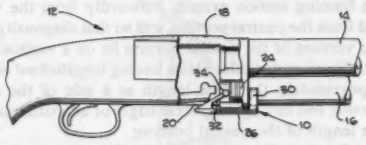
said bolt being operable on recoil to move said hammer to said cocked position,

said hammer, bolt and magazine being so positioned, arranged and disposed that said bolt cocks said hammer on recoil before recoiling back far enough to feed a fresh adapter cartridge toward said chamber as said bolt advances to said battery position and thereby prevent double firing.

4,058,923
SHOTGUN SAFETY DEVICE

Forrest D. Smith, P.O. Box 222, Orleans, Calif. 95556

Filed Dec. 6, 1976, Ser. No. 747,597
Int. Cl.[2] F41C *27/00*
U.S. Cl. 42—17 8 Claims



1. A detachable safety clip for repeating gun which gun includes a receiver, a barrel and a tubular magazine operably connected to said receiver, said detachable safety clip comprising:

an elongated base member;

means for releasably grasping said tubular magazine adjacent said receiver, said means for releasably grasping including arms projecting outwardly from said base member;

means for contacting a center primed cartridge to prevent said cartridge from moving out of said tubular magazine into said receiver, said means for contacting including a member projecting outwardly from said base member generally toward said arms.

4,058,924
PRETRIGGERABLE TRIGGER MECHANISM FOR SPORTING RIFLES

Franz Mullner, Steyr, Austria, assignor to Steyr-Daimler-Puch Aktiengesellschaft, Vienna, Austria

Filed Sept. 27, 1976, Ser. No. 727,139
Int. Cl.[2] F41C *19/02*
U.S. Cl. 42—69 R 3 Claims

1. A pretriggerable trigger mechanism for sporting rifles, which comprises

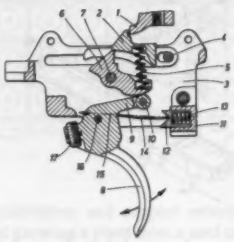
a sear, which is pivotally movable between an intercepting position and a non-intercepting position,

a sear spring urging said sear toward said intercepting position,

an intermediate lever pivoted on a stationary axis and

adapted to assume a locking position, in which said intermediate lever backs said sear in said intercepting position,

a trigger, which is adapted to assume an intermediate position and pivotally movable on a pivotal axis from said intermediate position forwardly to a defined set position and rearwardly to a triggered position, said trigger having an extension, which is arranged directly to engage said intermediate lever in said locking position when said trigger is in said intermediate position, to be clear of said intermediate lever when said trigger is in said preset position, and to cause said intermediate lever to move out of said locking position to release said sear for a movement out of said intercepting position toward said non-intercepting position against the action of said sear spring in response to a movement of said trigger from said intermediate position to said triggered position



an abutment, and

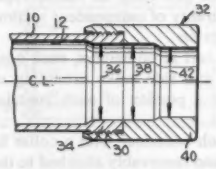
a compression spring retained between said abutment and said trigger and opposing a movement of said trigger to said preset position, said spring being arranged to have a line of action extending through said pivotal axis when, and only when, said trigger is in said preset position, said compression spring being arranged to cause said trigger to move beyond said intermediate position to said triggered position when said trigger has been slightly moved from said preset position toward said intermediate position.

4,058,925

CONCEPTS OF REMINGTON SUPER TRAP CHOKE

John P. Linde, Richfield Springs, and Douglas E. Bullis, Ilion, both of N.Y., assignors to Remington Arms Company, Inc., Bridgeport, Conn.

Filed Sept. 1, 1976, Ser. No. 719,406
Int. Cl.² F41C 21/18
U.S. Cl. 42—79 **6 Claims**



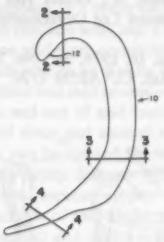
1. A pattern control means for a shotgun having a barrel with a bore therein through which a shot charge is explosively propelled, said pattern control means comprising at least two separate choke means that are progressively reduced in the direction of shot movement and through which the shot charge is constricted to control the pattern pellet density at a predetermined distance from the muzzle of the shotgun barrel, at least one of the choke means comprising a choke tube attachment with inner wall surfaces formed at the same time as the shotgun bore, means detachably mounting said attachment to the end of said barrel, said attachment wall surfaces including a bore with a rear cylindrical section adjacent the end of the barrel whose diameter is essentially the same as the exit bore of the barrel muzzle, an intermediate section which tapers inwardly to form a smaller diameter bore, and a forward cylindrical section, having a diameter essentially the same as the smaller diameter bore of the intermediate section.

4,058,926

WEIGHT FOR SPIN CASTING

Roy M. Harrigan, Bromley Mountain Road, Manchester, Vt. 05254

Filed Dec. 19, 1975, Ser. No. 642,565
Int. Cl.² A01K 95/00
U.S. Cl. 43—43.12 **3 Claims**



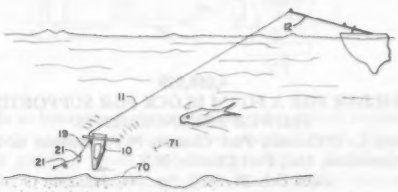
1. A weight for casting with fishing tackle which comprises: a quantity of material and means for selectively disengaging said material from an associated fishing line, said means for disengaging being responsive to forces associated with casting said weight, said quantity of material comprises a generally arcuate member having an axis disposed in a first plane and said means for selectively disengaging comprises a hook disposed at one axial extermity of said arcuate member, said hook and said axis being disposed in the same plane.

4,058,927

SNAG-FREE HYDRODYNAMIC FISHING SINKER CONTAINER

Virginia L. Hershey, and George P. Hershey, both of McDermott, Ohio, assignors to The Raymond Lee Organization, Inc., New York, N.Y.

Filed Aug. 11, 1976, Ser. No. 713,342
Int. Cl.² A01K 95/00
U.S. Cl. 43—43.13 **1 Claim**



1. A sinker for fishing purposes comprising

a flat shaped plate,

a conical unit fastened to the plate and projecting from a surface of the flat plate,

a weight located in the conical unit, and

fastening means to join the weight to the fishing line that extends through a hole in the plate,

said conical unit fastened to the plate at a distance from the mid-line of the plate with a shorter section of the plate extending in one direction from the conical unit and a longer section of the plate extending in the opposed direction from the conical unit with the said hole in the plate

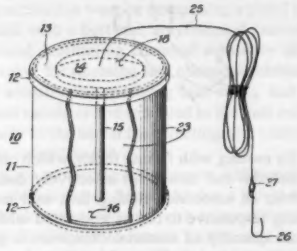
located in the said shorter section of the plate, so that the longer section of the plate serves as a tail surface that orients in water along an upward plane when the plate is pulled by a fishing line extending through the hole in the shorter section.

4,058,928

DISPOSABLE FLY KILLER CONTAINER

Robert Howard Digman, Sr., Desert Hot Springs, Calif., assignor to The Raymond Lee Organization, Inc., New York, N.Y.

Filed Aug. 18, 1976, Ser. No. 715,454
Int. Cl.[2] A01M *1/20*
U.S. Cl. 43—131 1 Claim



1. An insect trap in the form of a hollow box fitted with a removable cover, said box formed with an internal support member fixed to a contact member,

said contact member located by spaced distances from the inside surfaces of the box and cover, with the contact member in the form of a circular disc, formed with a convex surface located to face the removable cover, with the said convex surface of the contact member coated with an insecticide.

4,058,929

HOLDER FOR A FOAM BLOCK FOR SUPPORTING FLOWER ARRANGEMENTS

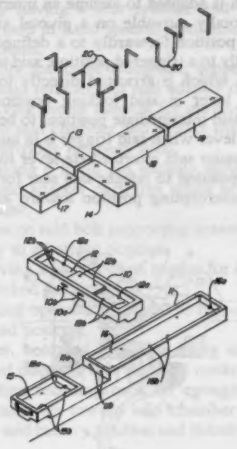
Donald L. O'Connell, Port Chester, N.Y., assignor to Floral Innovations, Inc., Port Chester, N.Y.

Filed Feb. 25, 1976, Ser. No. 661,096
The portion of the term of this patent subsequent to June 15, 1993, has been disclaimed.
Int. Cl.[2] A01G *5/04*
U.S. Cl. 47—41.12 6 Claims

1. A holder for at least one foam block for supporting flower arrangements for use in association with a support for mounting the holder substantially vertically comprising:

at least one hollow tray-like base member having outer side walls, substantially vertical inner side walls, and upper and lower bottom walls forming a water-confining receptacle having a compartment for supporting a foam block;

at least one aperture at the junction of the upper bottom wall and the lowermost side wall of said compartment, when mounted substantially vertically, for draining excess water from the foam block;



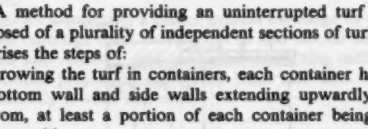
and at least one elongated fastening member adapted to engage and laterally support the foam block and detachably engageable with said compartment.

4,058,930

TURF GROWING APPARATUS

Oscar L. Miles, 7845 Sunset Lane, Indianapolis, Ind. 46260

Filed Dec. 30, 1975, Ser. No. 645,341
Int. Cl.[2] A01G *9/02*
U.S. Cl. 47—58 7 Claims



1. A method for providing an uninterrupted turf surface composed of a plurality of independent sections of turf which comprises the steps of:

a. growing the turf in containers, each container having a bottom wall and side walls extending upwardly therefrom, at least a portion of each container being water permeable;

b. providing each container with a collar having a portion overlapping and removably attached to the exterior of the side walls of the container and a portion extending above the top of the side walls, and grass-growing medium filling each container and extending above the top of the side walls and substantially to the top of the collar;

c. positioning a container and attached collar in the ground adjacent growing turf, the grass-growing medium within the container being level with the top of the medium in which the adjacent turf is growing;

d. removing the collar from the container to provide an uninterrupted grass surface between the turf in the container and the adjacent turf; and

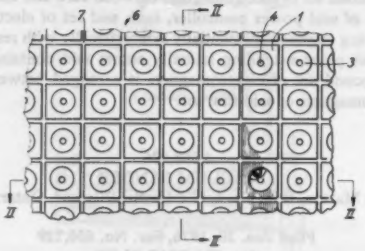
e. repeating steps *c* and *d*.

4,058,931

CULTIVATION BLOCK AND A METHOD FOR THE MANUFACTURING OF SAME

Bent Vestergaard, Taastrup, Denmark, assignor to Kosan A/S, Copenhagen, Denmark

Filed May 24, 1976, Ser. No. 688,996
Claims priority, application Denmark, May 28, 1975, 2357/75
Int. Cl.² A01G 9/02
U.S. Cl. 47—87 12 Claims



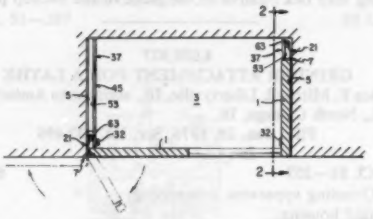
1. A plant cultivation and support structure adapted for germinating and growing a plant from a seed or from a cutting, the structure comprising a hygroscopic, root penetrable block having a flat base, a top spaced above the base, an indentation located in the top, the indentation being large enough to hold a seed or a seed pellet, an open bore leading from the bottom of the indentation of the base, the bore being small enough to prevent passage of a seed while permitting unhindered passage of roots therethrough, and at least one transverse channel extending clear through the block at the base, whereby the base of the block is adapted to rest without tipping on a flat planar support over which passes nutrient-bearing liquid, with the liquid passing unhindered through the channel so that there is no need for drainage means in the planar support.

4,058,932

MOUNTING APPARATUS FOR SWINGING AND SLIDING DOORS

James H. Peterson, and James A. Peterson, both of 73 Leroy Ave., Darien, Conn. 06820

Filed Mar. 11, 1976, Ser. No. 665,899
Int. Cl.² E05D 15/22
U.S. Cl. 49—177 8 Claims



1. Apparatus for mounting a swinging door for sliding into and out of an enclosure having an opening and at least one side wall comprising:

means forming an upper guide way adapted to be mounted to said enclosure adjacent to the top of said door,

means forming a lower guide way adapted to be mounted to said enclosure adjacent the bottom of said door, each of said guide way means having a longitudinal axis parallel to the direction in which said door is to be slid inwardly and outwardly of said enclosure and including a rack extending along an axis parallel to said longitudinal axis of said guide way means,

a shaft with an axis substantially transverse to the longitudinal axes of said guide way means,

an upper gear fixedly mounted adjacent the upper end of said shaft for rotation therewith,

a lower gear fixedly mounted adjacent the lower end of said shaft for rotation therewith, the teeth of each said gear meshing with the teeth of said respective racks causing said shaft to rotate in response to rectilinear movement of said shaft along said guide way means,

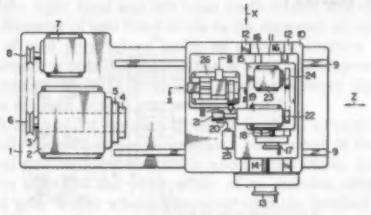
hinge means having a first member with a shaft connecting portion rotatably mounted on said shaft for rotation of said shaft with respect thereto and a pivot connecting portion in angular relationship with said shaft connecting portion and disposed in a plane parallel and immediately adjacent to said one side wall, and a second member rotatably mounted on said pivot connecting portion of said first member and adapted to be fixedly mounted to said door whereby said door and said second member can be moved rectilinearly in and out of said enclosure with said hinge means, and said door and second member, when out of said enclosure, can be rotated through an arc of substantially more than ninety degrees with respect to said first member between respective open and closed positions, said second member of said hinge means being in a plane immediately parallel and adjacent to said side wall when said door is in said closed position.

4,058,933

INTERNAL GRINDER

Takashi Ishida, 8-21, Gokiso-2-chome, Showa, Nagoya, Japan

Filed Sept. 3, 1976, Ser. No. 720,155
Claims priority, application Japan, Oct. 31, 1975, 50-149215[U]
Int. Cl.² B24B 53/02, 49/04, 5/10
U.S. Cl. 51—5 D 4 Claims



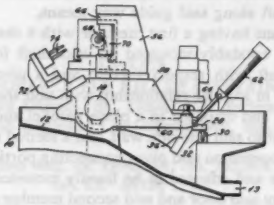
1. In an internal grinder comprising a head stock supporting a spindle adapted to mount a workpiece and rotate the same, and a grinding wheel head having a rotary shaft oriented parallel to the axis of said spindle in the face of said head stock and adapted to rotatably support a grinding wheel so as to effect grinding of the inner peripheral surface of a workpiece, the improvement comprising a grinding wheel dressing correcting carriage supporting the grinding wheel head and capable of moving in sliding motion in a direction which is at right angles to the axis of said spindle, and a cut feed carriage supporting said grinding wheel dressing correcting carriage and a grinding wheel dressing device and capable of moving in sliding motion in a direction which is at right angles to the axis of said spindle, said grinding wheel head and said grinding wheel dressing device forming a group which is movable in the axial direction of the spindle with respect to the head stock, whereby the internal surface of the workpiece can be ground.

4,058,934

INTERFORM GRINDING MACHINE

John W. Lovely, and Robert N. Hobbs, both of Springfield, Vt., assignors to Bryant Grinder Corporation, Springfield, Vt.

Division of Ser. No. 645,257, Dec. 29, 1975, Pat. No. 4,023,310.
This application Dec. 15, 1976, Ser. No. 750,660
Int. Cl.[2] B24B *53/04*
U.S. Cl. 51—5 D 1 Claim



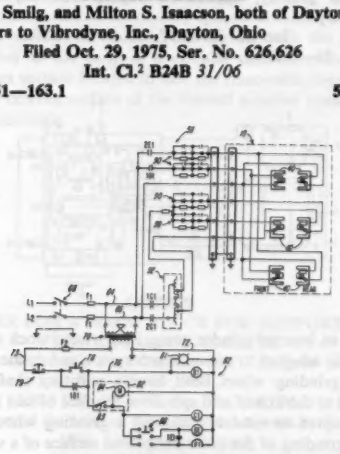
1. A grinding machine comprising a base, a slidebar mounted on the base, a wheelhead fixed on the base over the bar, a dresser base pivotally mounted on the bar for rotation thereabout, power means for rotating the dresser base about the bar, a dresser housing for receiving a dresser implement mounted on the dresser base on one side of the wheelhead and a gagehead mounted on the dresser base on the other side of the wheelhead whereby pivotal rotation of the dresser base about the bar in one direction causes the gagehead to be displaced toward the wheelhead and rotation of the dresser base about the bar in the opposite direction causes the dresser housing to be advanced toward the wheelhead.

4,058,935

VIBRATORY APPARATUS WITH ELECTROMAGNET CONTROL SYSTEM

Benjamin Smilg, and Milton S. Isaacson, both of Dayton, Ohio, assignors to Vibrodyne, Inc., Dayton, Ohio

Filed Oct. 29, 1975, Ser. No. 626,626
Int. Cl.[2] B24B *31/06*
U.S. Cl. 51—163.1 5 Claims



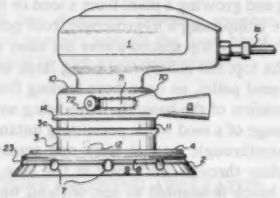
1. In vibratory apparatus including a frame, an elongated container adapted to receive a load of media and parts to be treated, spring means mounted on said frame and supporting said container for vibration, power operated means cooperating with said spring means for vibrating said container to produce orbital movement of the load within said container, said power operated means including a plurality of electromagnets spaced along the length of said container, and an armature member connected to said container and disposed adjacent each of said electromagnets, an improved system for controlling said electromagnets from an electrical power supply, comprising first control means consisting of an on-off switch for simultaneously connecting a first set of at least two longitudinally spaced said electromagnets directly to said electrical power supply to provide for only selecting either a non-variable predetermined power or zero power to said electromagnets, second control means including a variable power controller for simultaneously connecting a second set of at least two said electromagnets to said electrical power supply and providing for variably adjusting the electrical power supplied to said second set of electromagnets between zero and maximum power of said power controller, each said set of electromagnets being disposed substantially symmetrically with respect to a center plane extending laterally across said container, and said second set of electromagnets is arranged between said electromagnets of said first set.

4,058,936

VACUUM SANDER

Miksa Marton, R.R. No. 1, Old Castle, Windsor, Ontario, Canada

Filed Jan. 20, 1976, Ser. No. 650,729
Int. Cl.[2] B24B *23/00*
U.S. Cl. 51—170 T 15 Claims



1. A vacuum sanding apparatus comprising in combination, a disc shaped backup pad for connection to driving means and having an abrasive sanding disc detachably secured thereto, a vacuum housing mounted on the upper surface of the backup pad; a plurality of apertures in the operative surface of the abrasive disc and being in registry with apertures in the bottom surface of the backup pad, all said apertures being in communication with the interior of said vacuum housing; means on the housing for adjusting the amount of vacuum created therein; said housing being connectable to the driving means and being adapted to receive the same centrally in the housing; and a resilient collar intermediate the peripheral lower edge of the housing and the upper surface of the backup pad whereby the housing may flex relative to the plane of the backup pad.

4,058,937

GRINDER ATTACHMENT FOR A LATHE

Wallace F. Mitchell, Libertyville, Ill., assignor to Ammco Tools, Inc., North Chicago, Ill.

Filed Jan. 26, 1976, Ser. No. 652,496
Int. Cl.[2] B24B *19/26*
U.S. Cl. 51—259 6 Claims

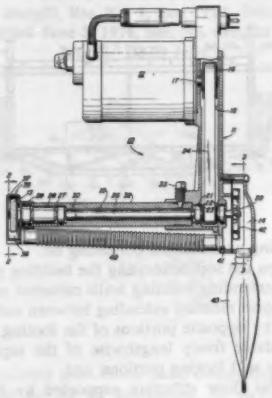
1. Grinding apparatus, comprising
a rigid housing,
a driven shaft having a first shaft portion and a second shaft portion,
spaced apart bearing means journaling said first shaft portion in said housing,
said second shaft portion being of tubular construction,
said first shaft portion extending onto said second shaft portion
resilient annular means compressed between said first and second shaft portions,
a grinding wheel fixedly mounted on said shaft,
a plurality of elastomeric rings respectively surrounding said

bearing means and compressed between said housing and said bearing means,

said rings providing the sole connection between said bearing means and said housing,

a third driven shaft portion to which said grinding wheel is connected,

said third driven shaft portion extending into said second shaft portion,



other resilient annular means compressed between said second and third shaft portions,

a driven pulley mounted to said first portion of said driven shaft,

an electric motor mounted to said housing and having an output shaft,

a drive pulley disposed on said output shaft, and

a flexible, resilient belt drivingly connected between said pulleys.

4,058,938

METHOD AND APPARATUS FOR GRINDING THE TOOTH FLANKS OF INTERNALLY-TOOTHED GEAR WHEELS

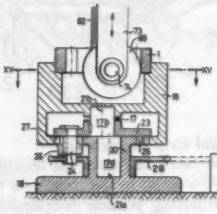
Hermann Härle, and Siegfried Eisenmann, both of Aulendorf, Germany, assignors to Furstlich Hohenzollernsche Huttenver Waltung Laucherthal, Germany

Continuation-in-part of Ser. No. 173,110, Aug. 19, 1971, Pat. No. 3,782,040. This application Aug. 29, 1973, Ser. No. 392,501

Claims priority, application Germany, Aug. 30, 1972, 2242610

Int. Cl.² B23F *5/08, 5/10*

U.S. Cl. 51—287 **40 Claims**



1. An apparatus for grinding the tooth flanks of a roughed-out, annular, internally-toothed gear wheel, comprising, a stationary base means; an eccentric shaft means having a driving portion, rotatably mounted in said base means, and a driven portion; a table means adapted to support said roughed-out gear wheel concentrically with respect to said driven portion of said eccentric shaft means, rotatably mounted on said driven portion of said eccentric shaft means; grinding wheel means mounted adjacent said table means, rotatable about an axis parallel to the plane of said roughed-out gear wheel, reciprocatable through the interior of said roughed-out gear wheel along an axis parallel to the axes of said driving portion and said driven portion of said eccentric shaft means, having a circumferentially-disposed grinding surface whose cross-sectional profile through its axis of rotation is equivalent to at least a part of the profile of at least one tooth of an externally-toothed pinion, adapted to mesh with the finished gear wheel, and adapted to grind said tooth flanks of said roughed-out gear wheel; and a plurality of gears meshing with each other, one of said gears being operatively coupled to said driven portion of said eccentric shaft means and said table means to drive said table means and the other of said gears being operatively coupled to said driven portion of said eccentric shaft means to drive said table means and said driven portion of said eccentric shaft means at different speeds of rotation.

36. A method for grinding the tooth flanks of a roughed-out, annular, internally-toothed gear wheel; comprising rolling one of the pitch circle of said roughed-out gear wheel and a fixed circle, having a diameter equal to the pitch circle of an externally-toothed pinion and adapted to mesh with the finished internally-toothed gear wheel formed from said roughed-out gear wheel, off the other; and, simultaneously with said rolling-off, rotating a grinding wheel on an axis parallel to the plane of said roughed-out gear wheel and reciprocating said grinding wheel through the interior of said roughed-out gear wheel along an axis parallel to the axis of said pitch circle of said roughed-out gear wheel and the axis of said fixed circle, while maintaining said axis of reciprocation of said grinding wheel a fixed distance from said axis of said fixed circle during the actual grinding of said tooth flanks, except for normal infeed of said grinding wheel; said grinding wheel having a circumferentially-disposed grinding surface whose cross-sectional profile has a shape equivalent to the profile of at least a part of at least one tooth of said pinion; the transverse thickness of the profile of the grinding wheel being smaller than the pitch of one tooth of the pinion, all of one of the right hand tooth flanks of the roughed-out gear wheel and the left hand tooth flanks of said gear wheel being ground first, said gear wheel being indexed an amount sufficient to bring the other of said right hand and left hand tooth flanks in contact with the grinding surface of said grinding wheel and thereafter grinding all of said other right hand and left hand tooth flanks; and the ratio of the diameter of said fixed circle to the diameter of said pitch circle of said gear wheel being an aliquant fraction whose denominator is equal to the number of teeth of said gear wheel and whose numerator is at least 2 and not more than said number of teeth of said gear wheel minus 2.

37. A method for grinding the tooth flanks of a roughed-out, externally-toothed pinion; comprising rolling one of the pitch circle of said roughed-out pinion and a fixed circle, having a diameter equal to the pitch circle of an annular, internally-toothed gear wheel, adapted to mesh with the finished pinion formed from said roughed-out pinion, off the other to produce a first rotation; simultaneously with said first rotation, rotating a grinding wheel on an axis parallel to the plane of said roughed-out pinion and reciprocating said grinding wheel through the exterior of said roughed-out pinion along an axis parallel to the axis of said pitch circle of said roughed-out pinion and the axis of said fixed circle along a circular arc in a plane normal to the axis of the pinion, said arc enveloping and approximating the contours of the two outermost flanks of a group of at least two adjacent teeth of the gear wheel, the center of the internal contour of said pinion coinciding with the center of the second axis, the radius line from said center of said arc through said grinding wheel always passing through a point on the pitch circle of said pinion, and said point always lying on a radius line of said center of said second axis through said axis of said pinion; said grinding wheel having a circumferentially-disposed grinding surface; and superimposing a second rotation about a second axis, parallel to the axis of said first rotation, on said first rotation, the distance between said axis of

said first rotation and said second axis being substantially equal to the difference between the radius of the fixed circle and the radius of the pitch circle of said roughed-out pinion and the ratio of the speed of rotation about said second axis to the speed of said first rotation about its axis being substantially equal to the radius of said pitch circle of said roughed-out pinion to said difference between the radius of the fixed circle and the radius of the pitch circle of said roughed-out pinion, said first and second rotation being in opposite directions.

4,058,939

TIERED GRANDSTAND

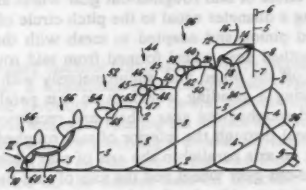
Gerard R. Camusot, Residence des Tours 23T, Glin-Mons, Belgium (B-7410)

Filed Sept. 23, 1975, Ser. No. 615,906

Claims priority, application Belgium, Sept. 27, 1974, 16198; Aug. 1, 1975, 645123

Int. Cl.² E04H 3/12

U.S. Cl. 52—2 23 Claims



1. A completely self-supporting tiered grandstand, comprising at least one collapsible fluid-tight casing having walls erectable by being filled with a fluid and/or solid substance and having a base portion which is adapted, in the erected condition of the casing, to rest on a substantially flat horizontal support surface, and having a top portion which in the erected condition of the casing defines a plurality of tiers, each tier having a portion defining a flat surface dimensioned and structured for walking thereupon.

4,058,940

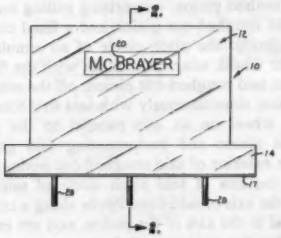
SYNTHETIC MONUMENT MARKER

Doyle C. McBrayer, Kansas City, Mo., assignor to Max Von Erdmannsdorff, Gladstone, Mo.

Filed Mar. 15, 1976, Ser. No. 666,643

Int. Cl.² E04H 13/00

U.S. Cl. 52—104 3 Claims



1. Structure for displaying a name or message comprising:
a concrete core;
an outer laminate of moldable plastic;
a layer of rigid foam between said concrete core and said outer laminate;
indicia means adjacent said laminate of moldable plastic for presenting a name or message; and
anchor means embedded in said concrete and projecting from the bottom of said core for securing said structure.

4,058,941

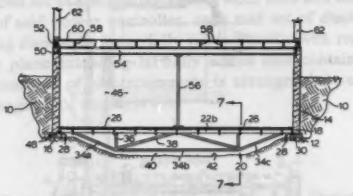
BUILDING CONSTRUCTION

Andrew Steven Zakrzewski, Burlington; Douglas Mel Clarkson, Brantford, and Gordon A. Webster, Dundas, all of Canada, assignors to Dominion Foundries and Steel, Limited, Hamilton, Canada

Filed June 8, 1976, Ser. No. 693,853

Int. Cl.² E04H 1/02

U.S. Cl. 52—169.1 12 Claims



1. A building construction consisting of:
a footing on the soil delineating the building perimeter;
vertically-extending building walls mounted on the footing;
a main support member extending between and supported at its ends by opposite portions of the footing with the said ends slidable freely lengthwise of the support member upon the said footing portions; and
a lowermost floor structure supported by the said main support member, the lowermost floor structure extending between and engaging the said building walls to oppose horizontal forces applied thereto by movements of the soil.

4,058,942

FLEXIBLE NON-SKID STRIP WITH FLUORESCENT SURFACE PORTIONS

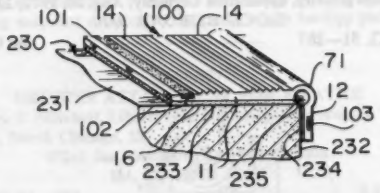
Hiromitsu Naka, No. 39, Oaza Shinmachi, Yashio, Saitama, Japan

Division of Ser. No. 483,005, June 25, 1974, abandoned. This application June 1, 1976, Ser. No. 692,017

Claims priority, application Japan, July 6, 1973, 48-79785[U]; July 6, 1973, 48-79786[U]; July 6, 1973, 48-79787[U]; Aug. 11, 1973, 48-94004[U]; Aug. 17, 1973, 48-96158[U]; Oct. 24, 1973, 48-122792[U]

Int. Cl.² B44D 5/08; E04F 11/16; B44C 1/26; B32B 3/04

U.S. Cl. 52—179 3 Claims



1. A flexible non-skid strip comprising:
a main body portion extending along the length of said strip and adapted to be secured to the tread of a stair;
a forward edge anchoring portion coextending with said main body portion parallel to and spaced from said main body portion and adapted to be secured to the riser of said stair;
an arcuate cross-section connection portion integrally connected to the upper surfaces of said main body portion and said anchoring portion, projecting above the upper surfaces of said main body portion and said anchoring portion, having a thickness smaller than that of the main body and anchoring portions connected thereby, and adapted to

bend about the stair edge of said stair so as to cover the stair edge; and

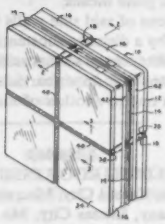
a fluorescent material layer being integrally embedded in said main body portion so as to expose the upper surface of said layer to the upper surface of said main body portion.

4,058,943

GLASS BLOCK PANEL

Lawrence W. Sturgill, Rte. No. 1, Box 111A, Schererville, Ind.

Filed June 3, 1976, Ser. No. 692,324
Int. Cl.² B32B 1/04
U.S. Cl. 52—227 6 Claims



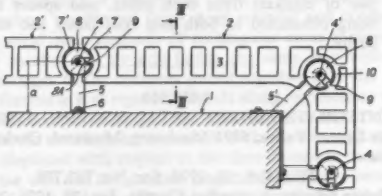
1. A prefabricated glass block panel comprising: a plurality of glass blocks having an upstanding rib circumferentially around the edge of each of said glass blocks; a plurality of rigid elongated members having a longitudinal center groove in each side thereof, said rigid members laterally spanning the edge of said glass blocks, one longitudinal part of said member being laterally slotted to the center groove thereof, said elongated members being interlocked together in said slotted openings forming a rigid reticular frame between said glass blocks and spacing said glass blocks in a width and breadth direction; and tie means circumferentially around the edge of said glass blocks.

4,058,944

BUILDING STRUCTURE WALL

Walter Rieger, Gmunden, Austria, assignor to Bauhutte Leitl-Werke Rieger-Anlagentechnik GmbH, Linz, Austria

Filed July 7, 1976, Ser. No. 703,224
Claims priority, application Austria, July 7, 1975, 5199/75
Int. Cl.² E04H 1/00
U.S. Cl. 52—235 17 Claims



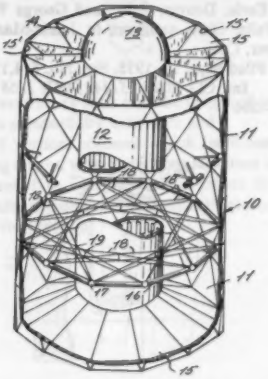
1. A facade construction for connection over the carcase wall of a building, said facade construction including a plurality of plate-like elements arranged beside and above one another in front of the carcase wall and secured to elongate members, the latter being supported by the carcase wall, and connecting means for connecting said plate-like elements to said elongate members, the improvement wherein said connecting means comprises a holding element associated with a plate-like element, said holding element including slot means sized to receive an elongate member, said slot means being outwardly open enabling said holding element to be inserted onto said elongate member at substantially any location along the latter and to be capable of longitudinal movement along said elongate member; said slot being oriented to render said holding element immovable in a direction away from the carcase wall; said plate-like element having a recess for receiving a portion of said holding element; said recess including surface means arranged to block movement of said plate-like element in a lateral direction away from the carcase wall.

4,058,945

PRESSURE AND BUCKLING RESISTING UNDULATED POLYHEDRAL SHELL STRUCTURE

Ronald H. Knapp, 1629 Hoopai Place, Pearl City, Hawaii 96782

Filed Apr. 4, 1974, Ser. No. 458,037
Int. Cl.² E04B 1/32
U.S. Cl. 52—244 21 Claims



1. A pressure and buckling resisting shell structure comprising

a. a plurality of flat polyhedral plates,

b. means for sealing said plates together along their edges to form a cylindrical shell with an undulating surface,

c. means for providing axial structural restraint and

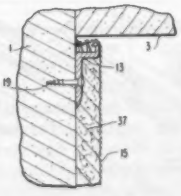
d. means for sealing each end of said shell structure.

4,058,946

WALLCOVERING

Yvon Habrant, 20 Square des Laminees, 63100 Clermont-Ferrand, France

Filed Sept. 3, 1976, Ser. No. 720,207
Int. Cl.² E04B 1/00
U.S. Cl. 52—273 2 Claims



1. In a room having a wall to be covered, and side walls and a ceiling adjacent said wall to be covered, said side walls and ceiling forming a plurality of corners with said wall to be covered; the improvement comprising a wallcovering comprised by a plurality of molding strips on said wall to be covered next to at least said ceiling and said side walls and extending in closely spaced parallel relationship to said corners, and

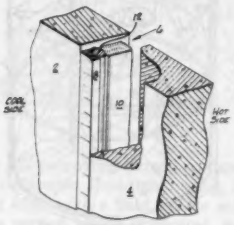
fabric parallel to and spaced from said wall to be covered, the edges of the fabric being clasped between said molding strips and the ceiling and side walls, said molding strips each comprising a base secured to said wall to be covered and an upstanding flange that extends along one of said ceiling and side walls, said flange having thereon a plurality of sharp points that are inclined in the direction of the adjacent said corner, whereby fabric may be forced in the direction of said corner between said flange and said ceiling or side wall with which said wall to be covered forms said corner toward which said points are inclined, the fabric then being retained in said corner by said points.

4,058,947

FIRE RESISTANT JOINT SYSTEM FOR CONCRETE STRUCTURES

Paul Lewis Earle, Denver, Colo., and George William Snider, Chagrin Falls, Ohio, assignors to Johns-Manville Corporation, Denver, Colo.

Filed Sept. 17, 1975, Ser. No. 614,113
Int. Cl.² E04F *15/14*; E04B *1/68*
U.S. Cl. 52—396 **8 Claims**



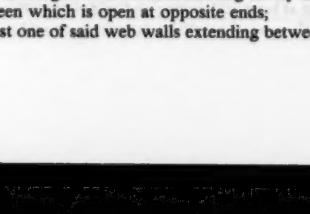
1. An improved fire resistive joint system for concrete panel building members which comprises an elastomeric joint sealant completely sealing the joint on the cold side of the panels and a compressible resilient mass of synthetic inorganic refractory fiber filling at least the external portion of the joint on the hot side of the panels, said fiber mass having sufficient resilience to maintain continuous operative contact with both sides of the joint during movements of the joint.

4,058,948

INSULATED MASONRY BLOCK

Millard R. Warren, Knoxville, Tenn., assignor to Warren Insulated Bloc, Inc., Knoxville, Tenn.

Continuation-in-part of Ser. No. 606,934, Aug. 22, 1975. This application Jan. 16, 1976, Ser. No. 649,795
Int. Cl.² E04B *2/00, 5/30*
U.S. Cl. 52—405 **12 Claims**



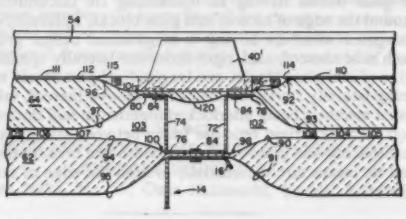
1. A masonry block comprising:
pairs of spaced opposed side walls and spaced opposed web walls of integral construction forming cavity means therebetween which is open at opposite ends;
at least one of said web walls extending between terminal ends of said side walls defining an outer peripheral portion of said block; and
a substantially rectangular insulative plate means of thermally insulative material disposed in said cavity means;
said insulative plate means extending across said cavity means from one to another of said web walls and terminating at said web walls;
said insulative plate means including essentially flat side faces disposed parallel to said side walls;
said side walls each including:
a portion spaced from a respective side face of said insulative plate means so as to define an air cell therebetween extending from one to another of said web walls, and
another portion projecting toward said respective side face of said plate means;
said other portions of said side walls having ends which are spaced apart by a distance substantially equal to the thickness of said plate means so that said other portions engage said plate means to form air barriers extending across both air cells from one to another of said web walls.

4,058,949

BUILDING ROOF INSULATION

Norman A. Bellem, Kansas City, Mo., assignor to Butler Manufacturing Company, Kansas City, Mo.

Filed Aug. 24, 1976, Ser. No. 717,348
Int. Cl.² E04B *2/00*
U.S. Cl. 52—407 **15 Claims**



1. An insulated roof for a building, comprising:
a roof purlin supporting a roof panel;
a plurality of discrete insulation blankets layered one on top of the other and positioned between said roof purlin and said roof panel, said layers forming a plurality of surfaces to increase the thermal resistance of a heat transfer path between the building interior and said roof panel; and
a spacer member interpositioned between a pair of contiguous ones of said layered insulation blankets to separate said pair of blankets from each other, said spacer member being connected to both said roof panel and said roof purlin.

4,058,950

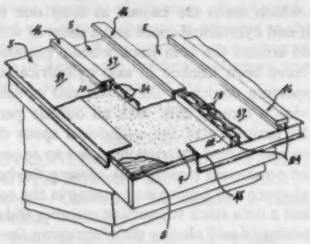
INTEGRATED SHEET METAL ROOFING SYSTEM

Louis Léoncé Vallee, 6392 Maubourg, Montreal, Quebec, Canada

Filed Oct. 19, 1976, Ser. No. 733,778
Claims priority, application Canada, Jan. 29, 1976, 244714
Int. Cl.² E04B *1/02*
U.S. Cl. 52—461 **8 Claims**

1. A metal roof structure of the batten type covering an underlying wooden roof structure comprising a series of battens of channel form having a bottom wall and a pair of side walls, the said side walls of the battens having a series of extensions at their upper edges, the said extensions being folded inwardly at right angles to the side walls, the said battens being disposed in spaced apart parallel arrangement on the said wooden roof structure, means to secure the bottom wall of the battens to said wooden roof structure, pan sections disposed between the said battens, the said pan sections having oppositely disposed side walls in contact with the side walls of the

said battens and said pan sections having extension portions foldable to interlock with the extensions of the side walls of the



battens so as to lock the pan sections to the battens, and a batten closure cap slidably engaged with each of said interlocked batten and pan sections.

4,058,951

FRAMES FOR BUILDINGS

Rudy Dean, 560 Hawthorn Road, Caulfield South, Victoria 3162, Australia

Filed May 21, 1976, Ser. No. 688,549
Int. Cl.[2] E04C *2/38*; E06B *1/04*
U.S. Cl. 52—656 2 Claims

1. For a building, a rectangular frame of which the peripheral members are formed from sheet material and consist of two identical open channels of rectangular cross section extending parallel side by side facing the same way with the adjacent edges of the channels joined together by a flat web having formed in it at regular intervals along its junctions with the channels slots of length less than half the depth of the channels, the slots formed in one side of the web being longitudinally displaced with respect to the slots formed in the other side of the web and the greatest longitudinal distance between an end of a slot and the end of the closest slot on the other side of the web being equal to the depth of the channels.

4,058,952

EXPANSION OF BUILDING STRUCTURE

Frank R. Donnelly, P.O. Box 218, Dover, N.J. 07801

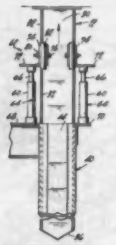
Filed Sept. 13, 1976, Ser. No. 722,693
Int. Cl.[2] E04B *1/00*
U.S. Cl. 52—741 16 Claims

1. A method of extending the height of a building structure, formed from support means including columns which are vertically oriented with respect to ground level and a roof structure supported on said columns, comprising the steps of:

cutting through each of said columns to form a transverse break;

surrounding said columns with guiding means for maintaining said columns in a vertical orientation with respect to said ground level;

raising said columns and said roof structure upwardly above



said transverse break such that the height of said building structure is substantially extended; and

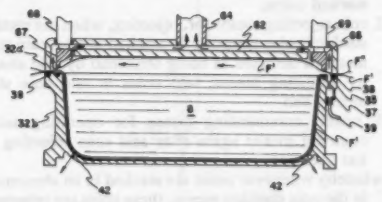
fastening said vertical columns which have been raised to said guiding means, whereby a floor structure is capable of being mounted to said support members in a position which is substantially intermediate said ground level and the raised roof level.

4,058,953

GAS FLUSHING OR FILLING PACKAGING MACHINE

Philip A. Sanborn, Jr., Spartanburg, S.C.; Shelby F. Westbrook, Chicago, and Donald A. Sullivan, Brookfield, both of Ill., assignors to W. R. Grace & Co., Duncan, S.C. and Hooper, Inc., Elmhurst, Ill.

Filed July 26, 1976, Ser. No. 708,809
Int. Cl.[2] B65B *31/02*
U.S. Cl. 53—22 A 24 Claims



1. In the method of preparing a gas filled or flushed package from two sheets of polymeric material, one sheet having an opening formed therein and the other having an aperture formed therein, the improvement which comprises:

a. sealing said sheets together in a continuous peripheral seal to enclose a product therebetween thereby forming a package, said aperture and opening being on opposed sides of said product and within said peripheral seal;

b. withdrawing air from the package through an opening in one sheet;

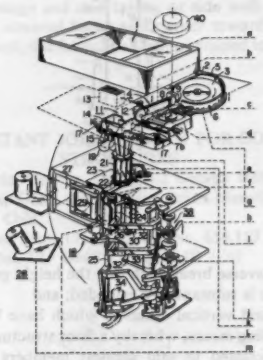
c. introducing gas into said package through an aperture in the other sheet; and,

d. sealing said aperture and said opening.

4,058,954
COIN PACKAGING MACHINE

Kazuto Asami, Himeji, Japan, assignor to Glory Kogyo Kabushiki Kaisha, Japan

Filed Oct. 12, 1976, Ser. No. 731,823
Int. Cl.² B65B 57/14, 57/20, 11/04
U.S. Cl. 53—54 3 Claims



1. A coin packaging machine for repeatedly packaging a predetermined number of coins separated according to denominations thereof, which comprises:

a. coin feeding means for feeding coins to be packaged;

b. coin counting means for counting the number of coins fed by said coin feeding means and for producing, when the number of coins counted coincides with a predetermined number, a coincidence signal;

c. coin stacking means for temporarily stacking coins fed by said coin feeding means until the coincidence signal is produced;

d. coin packaging means for packaging a stack of coins with packaging paper; and

e. control means for controlling said coin feeding means, coin counting means, coin stacking means and coin packaging means, said control means including:

1. abnormality detecting means for detecting whether the conditions of a stack of coins temporarily stacked in said coin stacking means is normal or abnormal when said coin packaging means is at a predetermined position prior to the start of packaging of the temporarily stacked coins;

2. coin rejecting means for, rejecting, when the state of the stack of coins temporarily stacked in said coin stacking means is detected as being abnormal by said abnormality detecting means, said coins in said coin stacking means; and

3. restart commanding means for operating said coin counting means again after said coin rejecting means has operated,

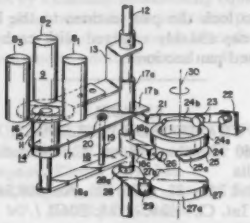
whereby whenever coins are stacked in an abnormal state in the coin stacking means, these coins are rejected from said coin stacking means, and the following packaging operation is automatically started.

4,058,955
COIN STACK SUPPORTING DEVICE IN COIN WRAPPING MACHINE

Shiro Nakai, and Minoru Nakamura, both of Himeji, Japan, assignors to Glory Kogyo Kabushiki Kaisha, Japan

Filed Oct. 18, 1976, Ser. No. 733,191
Claims priority, application Japan, Oct. 18, 1975, 50-125581
Int. Cl.² B65B 11/04
U.S. Cl. 53—212 1 Claim

1. In a coin wrapping machine the combination of a plurality of at least three vertically disposed wrapping rollers movable toward and away from each other to define a cylindrical stacking space having a diameter varying from the diameter of the smallest coins to be stacked and the largest coins to be stacked and into which coins are caused to drop one by one to be stacked in said cylindrical space and a sheet of wrapping paper is wrapped around the coin stack when a preselected number of coins have been stacked in said cylindrical space; a coin stack supporting device at the lower end of said cylindrical space having a closing disk with an outside periphery lying outside the periphery of the cylindrical space defined when said rollers are moved far enough apart to accommodate the largest size coins, said closing disk closing the bottom of said cylindrical space and having an opening in the central portion thereof, and a coin stack supporting member slidably received in said opening of said closing disk for raising the coin stack to

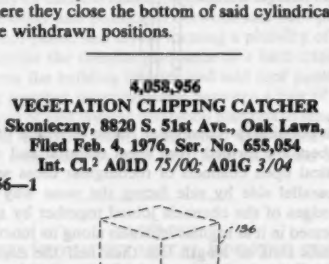


a level higher than that of said closing disk so as to enable crimping hooks to be inserted into the space thus formed between the lowermost end of the coin stack and the closing disk thereby to crimp the upper and lower projecting edges of said wrapping sheet wrapped around the cylindrical surface of the coin stack; and an operating mechanism connected to said coin stack supporting member for positioning the upper surface of said coin stack supporting member in the same plane as that of said closing disk or raising the coin stack supporting member so that the upper surface of said supporting member is at a level higher than that of said closing disk during the wrapping by the wrapping rollers and fold-crimping by the crimping hooks, and for moving said closing disk and said coin stack supporting member from the position at the bottom of said cylindrical space where they close the bottom of said cylindrical space to respective withdrawn positions.

4,058,956
VEGETATION CLIPPING CATCHER

Wayne J. Skonieczny, 8820 S. 51st Ave., Oak Lawn, Ill. 60453

Filed Feb. 4, 1976, Ser. No. 655,054
Int. Cl.² A01D 75/00; A01G 3/04
U.S. Cl. 56—1 4 Claims



1. A vegetation clipping catcher comprising: a support rail, said support rail having a work track and a storage neck formed integral with and substantially perpendicular to said work track; a plurality of ribs each slideably connected to said support rail by a slideable ring, said plurality of ribs being adapted to be positioned in a stored attitude on said storage neck substantially parallel to said work track; and an apron connected to said plurality of ribs, said apron having a slot and

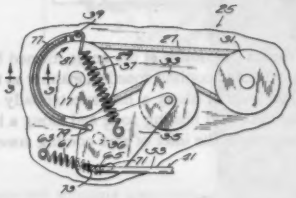
a flap positioned adjacent said slot, said apron slot being adapted to receive a stem of a shrub to be trimmed, said apron also being adapted to cover a ground cover surrounding said shrub to receive a plurality of clippings of said shrub, said ribs extending from one edge of the apron adjacent to the support rail to the opposite edge of the apron for supporting said apron, and a plurality of loops each holding said apron to each said ring in proximity with said support rail.

4,058,957

DEADMAN CONTROL AND BLADE CLUTCH FOR POWER ROTARY LAWN MOWERS

Ward A. Roseberry, Galesburg, Ill., assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed July 28, 1976, Ser. No. 709,540
Int. Cl.[2] A01D *35/26*
U.S. Cl. 56—11.3 8 Claims



1. A lawn mower comprising a blade housing, a cutter blade supported for rotation by and within said blade housing, a driven pulley drivingly connected to said cutter blade for rotation of the latter in response to rotation of the former, a drive pulley adapted to be rotatably driven by a source of power, an endless belt reeved around said drive pulley and said driven pulley, an arm, an idler pulley mounted for rotation on said arm, means mounting said arm for movement relative to a neutral position with said idler pulley disengaged from said belt, means resiliently urging said arm from said neutral position so as to engage said idler pulley with said belt to remove slack therefrom, a control linkage movable between a drive position and a neutral position, means biasing said control linkage toward said neutral position, and means connecting said linkage and said arm for displacing said arm to said neutral position against the action of said arm urging means when said control linkage is in said neutral position and for permitting movement of said arm, under the influence of said arm urging means and independently of said control linkage biasing means, from said arm neutral position so as to engage said belt to remove slack therefrom when said control linkage is in said drive position.

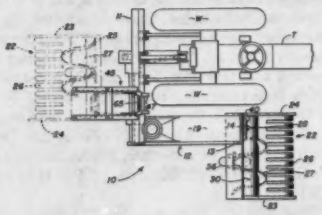
4,058,958

METHOD AND MEANS FOR CONVERTING A CROP PICKUP ON A CROP PROCESSING MACHINE BETWEEN FIELD AND TRANSPORT MODES

Loren G. Sadler, Stevens, and Aquila D. Mast, Lancaster, both of Pa., assignors to Sperry Rand Corporation, New Holland, Pa.

Filed Mar. 24, 1976, Ser. No. 670,191
Int. Cl.[2] A01D *75/22*
U.S. Cl. 56—228 12 Claims

1. In a mobile agricultural machine adapted to be moved by a vehicle, such as a tractor, forwardly over a field and being of the type including a frame detachably secured to said tractor, means mounted on said frame for processing crop material and delivering means releasably coupled to said crop processing means forwardly thereof and being disposed adjacent a side said tractor for delivering crop material to said crop processing means when said machine is in a field operating mode, the improvement comprising means for coupling said delivery means rearwardly of said processing means and said tractor for converting said machine to a transport mode whereby the width of said machine in said transport mode is less than the width of said machine in said operating mode, said coupling means including a support member extending rearwardly from said processing means and means on said delivery means adapted to register with said support member in a coupling



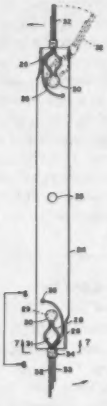
relationship for supporting said delivery means in said transport mode, said coupling means further including a subframe mounted on said frame for movement between a storage position and a coupling position, said support member being mounted on said subframe for movement therewith.

4,058,959

GRASS CUTTING BLADES

Robert J. Moss, 6319 S. Inwood Road, Shreveport, La. 71119, and Forrest G. Hurst, 417 Town South Drive, Shreveport, La. 71115

Filed Oct. 6, 1975, Ser. No. 620,152
Int. Cl.[2] A01D *55/18*
U.S. Cl. 56—295 3 Claims



1. A grass cutting blade comprising a main bar of thin flat metal, a grass cutting element one on each end of said main bar, each of said cutting elements being both removably and pivotably attached to said main bar, each of said cutting elements being made of a spring wire material having preformed loops in the wire, said cutting elements being also provided with legs extended in a plane parallel to the plane of said main bar and said loop section said legs having end sections which are bent substantially 90° away from the plane of said main bar, an anchoring rivet on each end of said bar one for each of said cutting elements, each of said elements being rotatable around its anchoring rivet from a folded non-operative position to an operative position with the legs of each element extending beyond the extreme ends of said main bar.

4,058,960

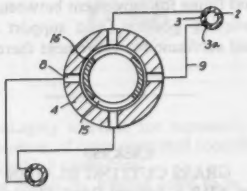
DISTRIBUTING DEVICE FOR SUPPLYING COMPRESSED AIR TO CHAMBERS OF APPARATUS FOR MAKING SELF-TWISTED PRODUCT

Pavel Mikhailovich Movshovich, Pechatnikov pereulok, 3, kv. 8, Moscow; Viktor Pavlovich Khavkin, ulitsa Vatutina, 11, kv. 4, Moskovskaya oblast, Khimki; Gennady Konstantinovich Maximov, Kaspiiskaya ulitsa, 20, korpus 3, kv. 137, Moscow; Natalya Borisovna Babushkina, Chasovaya ulitsa, 5b, kv. 15, Moscow; Alexandr Anatolievich Baranov, Proletarsky prospekt, 62, korpus 1, kv. 38, Moscow; Lev Nikolaevich Ivanov, Kotelnicheskaya naberezhnaya, 25/8, kv. 74, Moscow; Sergei Vladimirovich Nezelenov, Kineshemskoe shosse, 8a, kv. 6, Kostroma; Gennady Nikolaevich Shutov, ulitsa Sovetskaya, 119, kv. 101, Kostroma; Leonid Nikiforovich Tsygulev, Prospekt textilschikov, 94e, kv. 103, Kostroma, and Vadim Sergeevich Ilin, ulitsa 8 Okruzhnaya, 11, kv. 11, Kostroma, all of U.S.S.R.

Filed Aug. 17, 1976, Ser. No. 715,166

Int. Cl.[2] D01H *7/90*

U.S. Cl. 57—34 AT **5 Claims**



1. A distributing device for supplying compressed air to the jet nozzles of the swirl chambers of an apparatus for making a self-twisted product, comprising: a stationary hollow housing; a compressed air supply passageway in said housing; apertures in said housing and communicating with the jet nozzles of the swirl chambers; a rotary cylindrical distributing member accommodated in the internal space of said hollow housing; a gap defined between said housing and a cylindrical surface of said distributing member, permanently communicating with said compressed air supply passageway; said cylindrical distributing member being shaped as a sleeve with a bottom, a cylindrical wall and an open end facing said compressed air supply passageway; passages in the cylindrical wall of said distributing member, adapted, with said cylindrical distributing member rotating in operation, to communicate periodically with the jet nozzles of the swirl chambers through said apertures in said housing, to supply compressed air to the jet nozzles of the swirl chambers.

4,058,961

FALSE TWIST-CRIMPING MACHINE

Hermann Kubler, Remscheid-Luttringhausen, Germany, assignor to Barmag Barmer Maschinenfabrik Aktiengesellschaft, Remscheid-Lennep, Germany

Filed June 30, 1976, Ser. No. 701,155

Claims priority, application Germany, July 5, 1975, 2530125; Oct. 4, 1975, 7531545[U]

Int. Cl.[2] D02G *1/02*

U.S. Cl. 57—34 HS **5 Claims**

1. A false-twist crimping machine for processing filament yarn, said machine comprising:

a side frame having a bobbin located thereon for supplying the filament yarn,

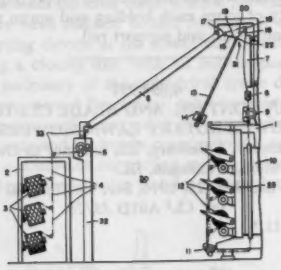
a delivery means for guiding said yarn to an upwardly inclined heating zone,

a middle frame carrying a downwardly disposed cooling zone which receives said yarn as it feeds from said heating zone,

a false-twisting means for receiving said yarn as it feeds from said cooling zone,

a take-off for supplying said yarn emitting from said false-twisting means to a winding device located at said middle frame,

said heating zone sloping at an obligue angle between said side frame and said middle frame, and



a yarn guide means positioned at the angle formed between said heating zone and cooling zone in a manner so that said yarn may run over it along a line substantially tangent from the outlet of said heating zone and along a line substantially tangent to the inlet of said cooling zone.

4,058,962

METHOD AND APPARATUS FOR DETECTING PERIODIC YARN IRREGULARITIES IN A YARN BETWEEN A YARN FORMING STAGE AND A YARN WINDING STAGE

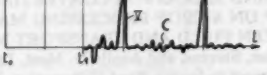
Gelli Spescha, and André Lattion, both of Winterthur, Switzerland, assignors to Rieter Machine Works, Ltd., Winterthur, Switzerland

Filed Jan. 19, 1977, Ser. No. 760,575

Claims priority, application Switzerland, Jan. 26, 1976, 888/76

Int. Cl.[2] D01H *13/22*

U.S. Cl. 57—34 R **24 Claims**



1. A method of detecting periodic yarn irregularities occuring at predetermined intervals of length in a yarn passing between a yarn forming stage and a yarn winding stage of a yarn producing machine, said method comprising the steps of

continuously measuring a predetermined characteristic of the yarn at a first station during movement of the yarn from the forming stage to the winding stage and generating a first continuous electrical signal proportional to variations in the measured characteristic;

generating a second signal identical to said first signal after a time lag corresponding to a multiple of the periodic interval of yarn length; and

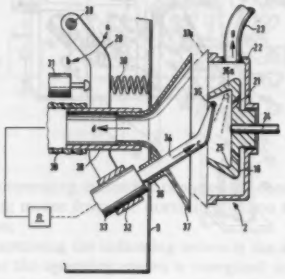
continuously multiplying said first signal with said second signal to detect periodic yarn irregularities in the yarn.

4,058,963

OPEN-END SPINNING MACHINE WITH A PLURALITY OF SPINNING UNITS AND WITH AT LEAST ONE SERVICING DEVICE

Fritz Stahlecker, Bad Uberkingen, Germany, assignor to Fritz Stahlecker and Hans Stahlecker, Germany

Filed Mar. 4, 1977, Ser. No. 774,539
Claims priority, application Germany, Mar. 27, 1976, 2613180
Int. Cl.[2] D01H *11/00, 1/12*
U.S. Cl. 57—56 21 Claims



1. Open-end spinning apparatus including a servicng device for servicing individual spinning units of an open-end spinning machine of the type having a spinning unit with a spinning rotor disposed in a housing; said servicing device including:

a suction device,

and suction device moving means for moving said suction device toward a spinning rotor to a servicing position where said suction device can remove fiber residues and the like from the spinning rotor by applying suction thereto.

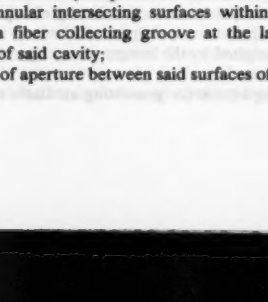
wherein a suction portion of said suction device includes a flange which contacts the housing surrounding the spinning rotor in the manner of a lid when in said servicing position.

4,058,964

OPEN-END ROTOR FOR A SPINNING MACHINE

Herbert Stalder, Winterthur, Switzerland, assignor to Rieter Machine Works, Ltd., Winterthur, Switzerland

Filed Apr. 5, 1976, Ser. No. 673,355
Claims priority, application Switzerland, Apr. 11, 1975, 4636/75
Int. Cl.[2] D01H *1/12*
U.S. Cl. 57—58.89 13 Claims



1. A rotor for an open-end spinning machine having

a cavity concentrically disposed about a rotational axis;

a pair of annular intersecting surfaces within said cavity defining a fiber collecting groove at the largest inside diameter of said cavity;

a first angle of aperture between said surfaces of from 45° to 90°;

a rounded groove bottom of a radius from 0.1 to 0.5 millimeters between said surfaces;

a second angle between a straight line bisecting said first angle and a plane of rotation of said groove of a value from 0° to 45°;

a third angle between said plane of rotation and a yarn take-off direction from said groove of a value from 0° to 25°; and

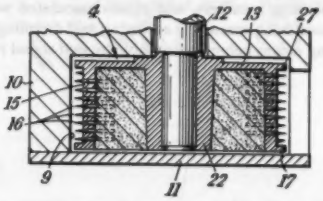
an annular edge sufficient to deflect a taken-off yarn between said fiber collecting groove and a yarn take-off tube.

4,058,965

OPEN-END SPINNING MACHINES

Jack Shaw, Read near Burnley, and Bruce Ellingham, Brierfield, both of England, assignors to Platt Saco Lowell Limited, Rossendale, England

Filed June 27, 1975, Ser. No. 590,859
Claims priority, application United Kingdom, July 3, 1974, 29500/74
Int. Cl.[2] D01N *1/12*
U.S. Cl. 57—58.91 15 Claims



1. In an open end spinning machine for the open end spinning of textile fibres, comprising, a spinning element, a rotatable fibre opening roller, means for feeding fibres in the form of a sliver to said opening roller, fibre conveying means for conveying in discrete form to said spinning element fibres opened by said opening roller, said opening roller comprising a boss portion, an end wall portion extending radially outwardly from said boss portion at one end thereof, a cylindrical shell portion extending from said wall portion over and in coaxial relation to said boss portion to form an annular cavity between an outer surface of said boss portion, an inner surface of said wall portion and an inner surface of said shell portion, said shell portion having a plurality of holes therein and a plurality of fibre engaging pins located in the holes, said pins passing from within the annular cavity and having end portions terminating in points protruding from the outer surface of the shell portion, wherein a plastic filler material fills the cavity in the roller and forms a planar end face to the roller.

4,058,966

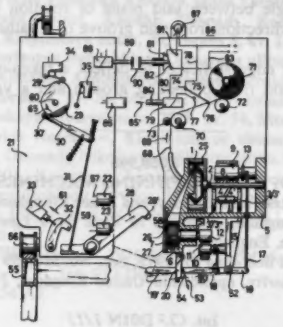
DEVICE FOR PROTECTING TANGENTIAL DRIVES OF A TEXTILE MACHINE

Hans Raasch, Monchengladbach, Germany, assignor to W. Schlafhorst & Co., Monchengladbach, Germany

Filed Aug. 6, 1976, Ser. No. 712,196
Claims priority, application Germany, Aug. 7, 1975, 2535254
Int. Cl.[2] D01H *13/20, 13/14*
U.S. Cl. 57—78 8 Claims

1. Device for protecting against destruction of or damage to tangential strands and rotatable members of a textile machine having a plurality of individual work stations and operating with traveling threads, comprising monitoring means capable of traveling along the textile machine for successively monitoring rotation of the rotatable members driven by the tangential strands at each of the plurality of individual work stations, said monitoring means comprising at least one signal receiver, and at least one signal transmitter associated with the rotatable

members at the respective work stations being monitored with respect to the rotation thereof, coupling means at each of the work stations for removing a faulty tangential strand from the rotatable members associated therewith and for simultaneously



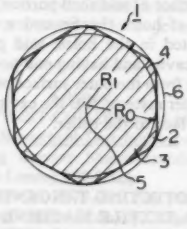
securing the tangential strand against renewed engagement with the rotatable members, and means associated with said traveling monitoring means for actuating said coupling means, said actuating means being controllable by said signal receiver.

4,058,967

TEXTURED POLYESTER MULTIFILAMENT YARN

Hiroyuki Iimuro; Takumi Horiuchi; Yoji Kuroda; Kikuo Hori, all of Matsuyama, and Tatumi Kawano, Iyo-gun, all of Japan, assignors to Teijin Limited, Osaka, Japan

Filed Apr. 22, 1976, Ser. No. 679,323
Claims priority, application Japan, May 8, 1975, 50-54247; Oct. 20, 1975, 50-125341; Oct. 20, 1975, 50-125342
Int. Cl.² D02G *3/34*
U.S. Cl. 57—140 J 14 Claims



1. A polyester multifilament feed yarn, comprising a plurality of undrawn polyester filaments each having a multilobal cross sectional profile having 5 to 10 lobes projected radially with substantially equal angular intervals therebetween about the center of the filament, said cross sectional profile satisfying the following relationship (1):

$$1.05 \leqq R_1/R_0 \leqq 1.16 \quad (1)$$

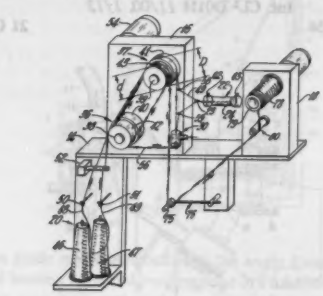
wherein R_0 represents the radius of an imaginary circle inscribed within said cross section around the center of the filament, R_1 represents the radius of another imaginary circle circumscribed about the tips of at least half the total number of said lobes around the center of the filament.

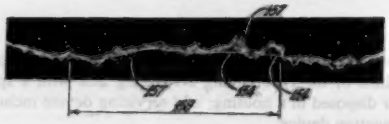
4,058,968

BULKED YARN AND METHOD OF FORMING A BULKED YARN

Gustav E. Benson, Newark, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Sept. 3, 1976, Ser. No. 720,321
Int. Cl.² D02G *3/34, 1/16, 3/24*
U.S. Cl. 57—140 R 22 Claims





1. A bulked yarn comprising:

a continuous nucleus portion of tightly grouped and substantially parallel continuous filaments, and a surface portion having slub regions and generally uniformly bulked regions along the length of the yarn, the uniformly bulked regions having selected groups of said nucleus filaments which extend outwardly from said nucleus in undulatory waves having less filament density than the nucleus, the slub regions having selected groups of said nucleus filaments which extend outwardly from said nucleus in undulatory waves having less filaments density than the nucleus, the amplitude of the exterior waves of the slub regions being substantially larger than the amplitude of the exterior waves of the uniformly bulked region.

4,058,969

ELECTRIC TIMEPIECE FOR DISPLAYING THE OPERATING CONDITION THEREOF

Munetaka Tamaru, Tokyo; Kazunari Kume, Tokorozawa; Hideshi Oono, Sayama; Minoru Watanabe, Tokorozawa; Hideo Sato, Sayama, and Shigeru Morokawa, Higashiyamato, all of Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan

Division of Ser. No. 526,980, Nov. 25, 1974, Pat. No. 3,998,043.
This application Sept. 8, 1976, Ser. No. 721,439
Claims priority, application Japan, Dec. 26, 1973, 49-3258; Dec. 26, 1974, 50-22537
Int. Cl.² G04C *3/00*
U.S. Cl. 58—23 BA 8 Claims

1. In a timepiece which is powered by voltage from a battery, an alarm system also powered by said battery indicating that the voltage of the battery has dropped below a predetermined level, said alarm system comprising:

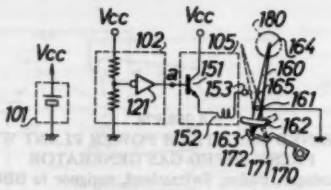
indicating means for indicating that the voltage has dropped below the predetermined value by changing from a normal condition to an alarm condition;

means energized by the battery means operating the indicating means;

a detecting circuit for generating an alarm signal when the

voltage of the battery drops below the predetermined level;

switch means connected between the battery and the operating means and connected to the detecting circuit for allowing the battery to energize the operating means upon the generation of the alarm signal, said switch means including means for deenergizing the operating means



after the operating means has changed the condition of the indicating means from the normal condition to the alarm condition;

means for retaining the indicating means in the alarm condition after the operating means is energized; and

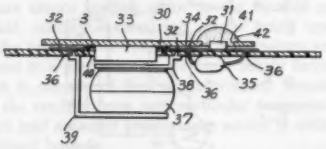
the indicating means including a mechanical member which is moved to change from a normal position to an alarm position.

4,058,970

DIGITAL DISPLAY ELECTRONIC TIMEPIECE

Matzuo Ichinose, Suwa, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Filed Mar. 12, 1976, Ser. No. 666,298
Claims priority, application Japan, Mar. 12, 1975, 50-29844
Int. Cl.² G04C *3/00*
U.S. Cl. 58—23 R **7 Claims**



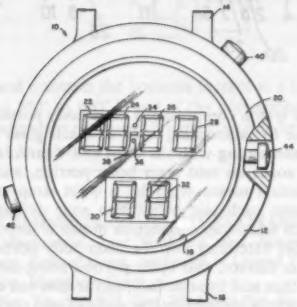
1. A digital display electronic timepiece circuit assembly comprising in combination battery means, timekeeping circuitry coupled to said battery means for being energized thereby and for producing low frequency timekeeping signals representative of actual time, said timekeeping circuitry being formed in at least one intergrated circuit chip, a digital display panel for receiving said timekeeping signals and digitally displaying time in response thereto, and an organic film substrate, said film substrate, including an electric wiring pattern formed on a first surface thereof, said substrate supporting said display panel and each said integrated circuit chip on said first surface to thereby electrically couple said display panel and each said chip together by said wire pattern, the surface of said film substrate not supporting said display panel being adapted to secure said battery means, said substrate having a first through-hole for receiving a portion of said display panel, said digital display panel including a front glass panel of substantially larger widthwise and lengthwise dimension then said portion of the display panel received in the through-hole of said substrate, the back surface of said front panel having segment electrode leads disposed thereon and coupled to said electrode wiring pattern formed on said first surface of said film substrate, said back surface of said glass panel being dimensioned to structurally support said organic film substrate and certain of said elements supported on the back surface thereof, said front glass panel further including an opening therein for permitting said integrated circuit chip to be supported on said organic film to extend through said opening.

4,058,971

DIGITAL WRISTWATCH AND STOPWATCH

Ronald D. Epperson, Newport Beach, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Apr. 26, 1976, Ser. No. 679,953
Int. Cl.² G04F *7/04*; G04B *19/30*
U.S. Cl. 58—39.5 **2 Claims**



1. A resettable interval timer in combination with, but functioning independently from a digital watch which provides horological information comprising:

a plurality of push buttons;

a crystal oscillator;

a first and second divider connected to said oscillator for dividing the pulses from said oscillator;

first counting means for providing inputed coded horological information;

second counting means for providing inputed coded interval timing information;

a plurality of display devices for displaying said horological and said interval timing information;

watch control logic means connected to said first divider for multiplexing said horological information to predetermined display device depending upon the sequence in which said push buttons are depressed;

stopwatch control logic means connected to said second divider for multiplexing said interval timing information to predetermined display devices depending upon the sequence in which said push buttons are depressed;

pulse detection means connected between said push buttons and said watch and stopwatch control logic means for detecting a predetermined number of push button depressions within a predetermined time period;

watch counter select logic means connected between said watch control logic means and said first counting means for slewing and advancing said horological information in said first counting means;

stopwatch counter select logic means connected between said stopwatch control logic means and said second counting means for controlling the starting, stopping and resetting of said interval timing information;

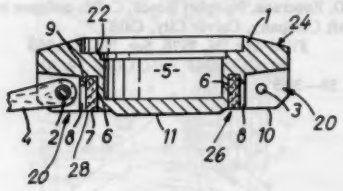
a seven-segment decoder connected between said watch control logic, stopwatch control logic, first and second counting means and said display devices for converting the inputed coded information into seven-segment information which is delivered to said display devices.

4,058,972

WRISTWATCH HAVING A PERFUME CHAMBER

Heinz Hermann Weick, 94, rue de la Servette, 1202 Genf, Switzerland

Filed Jan. 22, 1976, Ser. No. 651,244
Claims priority, application Switzerland, Jan. 24, 1975, 964/75; Mar. 10, 1975, 3037/75
Int. Cl.[2] A45C *11/10*; G04B *37/12*
U.S. Cl. 58—88 E 7 Claims



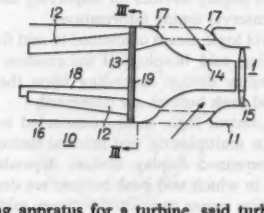
1. A wrist watch comprising: a main body portion having a front surface for associating with a watch glass and a rear surface for associating with the wrist of a wearer; at least two connection zones on said main body portion, and including strap connection means whereby a wrist strap can be connected thereto, each said connection zone defining a recess within which said strap connection means is disposed; a perfume chamber extending into the main body portion from an outer portion thereof, said outer portion being situated more rearwardly than said front surface; and at least one evaporation orifice or aperture defined by the walls of said perfume chamber, adjacent one of said connection zones and opening at said rear surface.

4,058,973

APPARATUS FOR STARTING TURBINE PLANTS

Stig Ferm, and Ragnar Torstenfelt, both of Finspong, Sweden, assignors to Stal-Laval Turbin AB, Finspong, Sweden

Filed Mar. 3, 1976, Ser. No. 663,589
Claims priority, application Sweden, Mar. 5, 1975, 7502426
Int. Cl.[2] F02C *7/26*
U.S. Cl. 60—39.09 R 4 Claims



1. A starting appratus for a turbine, said turbine having a compressor with an inlet opening, comprising:

means for supplying compressed air to said compressor to start said turbine, said means being positioned in front of and spaced from said inlet opening;

a selectively displaceable cover means surrounding said means for supplying compressed air, for providing a closed air channel between said means for supplying compressed air and said compressor when said cover means is displaced into sealing contact with said inlet opening during turbine starting;

means connected in parallel with said means for supplying compressed air, for supplying dry air to said turbine to minimize formation of condensation and collection of foreign material in said turbine during shutdown periods; and

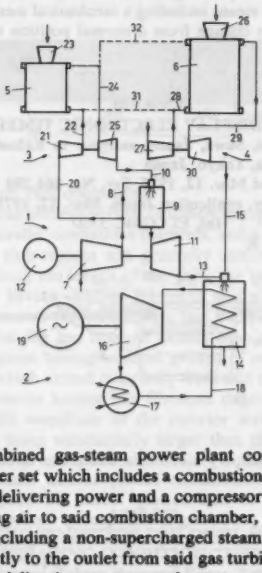
means for selectively admitting either said compressed air to said compressor to start said turbine or said dry air to said compressor to protect said turbine during said shutdown periods.

4,058,974

COMBINED GAS/STEAM POWER PLANT WITH PRESSURIZED-GAS GENERATOR

Hans Pfenninger, Baden, Switzerland, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed Mar. 11, 1976, Ser. No. 665,796
Claims priority, application Switzerland, May 14, 1975, 6182/75
Int. Cl.[2] F02B *43/08*; F02C *3/22*
U.S. Cl. 60—39.12 4 Claims



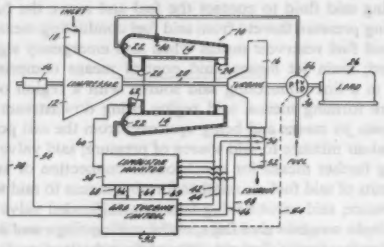
1. A combined gas-steam power plant comprising a gas turbine power set which includes a combustion chamber, a gas turbine for delivering power and a compressor driven thereby for delivering air to said combustion chamber, a steam turbine power set including a non-supercharged steam generator connected directly to the outlet from said gas turbine, and a steam turbine for delivering power, at least two pressurized gas generators for producing fuel gas for firing said combustion chamber and steam generator, respectively at least two separate and independent charging groups each comprising a gas turbine and a compressor driven thereby the gasification air required for generation of that portion of the fuel gas supplied to said combustion chamber being taken from the combustion air conveyed by the compressor of said gas turbine power set and compressed further in the compressor of one of said charging groups up to the pressure prevailing in one of said fuel generators, the gasification air required for generation of that portion of the fuel gas supplied to said steam generator being compressed in the compressor of the other charging group from ambient pressure to the pressure prevailing in the other fuel gas generator, and the said two proportions of the fuel gas produced respectively by said fuel gas generators being passed through the gas turbine of their respective charging groups and thence to said combustion chamber and steam generator, respectively.

4,058,975

GAS TURBINE TEMPERATURE SENSOR VALIDATION APPARATUS AND METHOD

Kendall E. Gilbert, Schenectady; Daniel Johnson, Rexford, and Robert Raymond Macier, Saratoga Springs, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 8, 1975, Ser. No. 638,852
Int. Cl.² F02C 9/08
U.S. Cl. 60—39.28 T 1 Claim



1. A gas turbine system having a compressor, a combustion system for receiving fuel and pressurized air from said compressor and for generating an annular hot gas stream, a turbine driven by the hot gas stream and operative to drive said compressor, an exhaust duct for exhausting said hot gas stream, means for controlling the operation of the gas turbine in response to various parameters of gas turbine operation including the temperature of the hot gas stream as sensed by a plurality of temperature sensors, said temperature sensors disposed in an annular array in said exhaust duct with the spacing between adjacent temperature sensors being generally equal and selected such that a temperature streak caused by a combustion system malfunction would affect at least two adjacent temperature sensors, and means for determining the validity of each temperature sensor reading prior to use by said controlling means, said validity determining means being operative to examine the temperature readings of temperature sensors that are adjacent to a particular temperature sensor having a reading which is outside of first predetermined bounds and for rejecting the reading from said particular temperature sensor when each said adjacent temperature sensor is within second predetermined bounds.

4,058,976

METHOD AND APPARATUS FOR REMOVAL OF LAST TRACES OF SOLUBLE ASH AND ELEMENTS FROM SOLVENT REFINED COAL

Fred Henry Kindl, Schenectady, N.Y., assignor to Encotech, Inc., Schenectady, N.Y.

Filed Nov. 21, 1975, Ser. No. 634,283
Int. Cl.² F02C 3/26; C10L 9/00
U.S. Cl. 60—39.46 S 7 Claims

1. Apparatus for the removal of the last traces of sodium and potassium salts and other soluble ash from solvent refined coal at a power generation site comprising:

a. crushing and feeding means for feeding finely divided solvent refined coal and water in the form of a slurry into an initial mixing and dearating chamber;

b. proportioning means to control the proportion of water to solvent refined coal;

c. an initial mixing and deaerating chamber for receiving the controlled proportions of solvent refined coal and water;

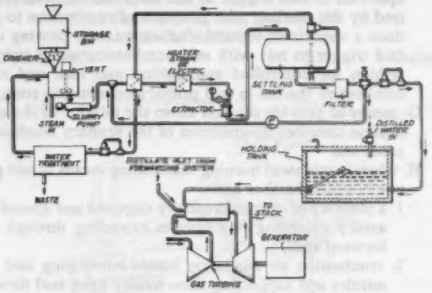
d. mixing means for stirring;

e. steam supply and proportioning means to properly control the amount of steam and thereby to achieve heating of the mixture to the steam-water saturation temperature at a chamber internal pressure of about 1 atmosphere;

f. second feeding means for feeding the coal slurry into a pressure tight vessel;

g. a pressure-tight vessel into which the aforementioned second feeding means discharges the coal slurry; and,

h. heating means to heat the contents of said pressure-tight



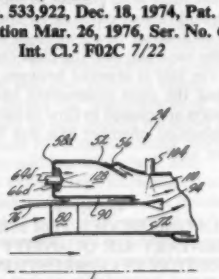
vessel and maintain the contents thereof at a temperature of about 500° to 600° F and at the corresponding water-steam saturation pressure for a time ranging from approximately ½ to 2 hours.

4,058,977

LOW EMISSION COMBUSTION CHAMBER

Stanley J. Markowski, East Hartford, and James J. Nolan, Glastonbury, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Division of Ser. No. 533,922, Dec. 18, 1974, Pat. No. 3,973,395.
This application Mar. 26, 1976, Ser. No. 670,915
Int. Cl.² F02C 7/22
U.S. Cl. 60—39.65 4 Claims



3. A combustion chamber concentric about an axis and having outer wall means and inner wall means supported in spaced relation to define an annular combustion chamber cavity therebetween and wherein said outer wall means and inner wall means are shaped so as to define:

A. an annular pilot combustion zone positioned at the combustion chamber forward end and having a forward wall,

B. means to establish combustion in said pilot combustion zone in swirling fashion about said axis and so that the pilot products of combustion depart the pilot combustion zone in swirling flow fashion about said axis,

C. an annular primary combustion zone located downstream of said pilot zone and shaped to increase in cross-sectional area in a downstream direction so as to be in the form of a diffuser,

D. a primary combustion zone trigger mechanism in the form of a corrugated ring mounted concentrically about the axis and having corrugations canted with respect to the axis and increasing in amplitude in a downstream direction and supported to be located at the entrance of the primary combustion zone so that the swirling pilot zone products of combustion will pass over the convolutions of the trigger,

E. means to pass combustion air over the opposite corrugation surface of the trigger to produce accelerated mixing

between the fluids passed over opposite surfaces of the trigger,

F. means to introduce fuel droplets into the combustion chamber and circumferentially thereabout at an axial station upstream of said trigger to mix with and be flash vaporized by the swirling pilot products of combustion to produce a vaporized, vitiated, fuel-air mixture flowing over said trigger to mix with said combustion air in swirling fashion for controlled autoignition and lean and rapid combustion therein in said primary combustion zone,

G. means to provide dilution air to the interior of the combustion chamber downstream of the primary combustion zone, and

H. wherein said swirl burning establishing means in said pilot combustion chamber are:

1. a plurality of circumferentially disposed and spaced and axially extending fuel nozzles extending through said forward wall,

2. combustion air admission means enveloping said fuel nozzles and supporting them axially from said forward wall, and

3. a plurality of circumferentially oriented and spaced deflector vanes projecting into said pilot combustion chamber from said forward wall and supported therefrom one such vane positioned between adjacent fuel nozzles, each deflector vane being hollow and extending for substantially the full radial dimension of the pilot combustion chamber and having an axially directed forward end communicating with the exterior of the combustion chamber to receive cooling air therefrom and having an afterend supported from said forward end and smoothly changing shape so as to define a substantial angle with respect to the combustion chamber axis, and further defining an open downstream end so that cooling air flows through the interior of each deflection vane and into the pilot combustion zone and so that the fuel is injected between adjacent deflector vanes and the pilot combustion chamber products of combustion are caused to flow in swirling fashion about the combustion chamber axis due to the shape of the deflector vanes.

4,058,978

REGULATING DEVICE FOR METERING A SUPPLEMENTARY AIR QUANTITY TO IMPROVE COMBUSTION IN COMBUSTION ENGINES

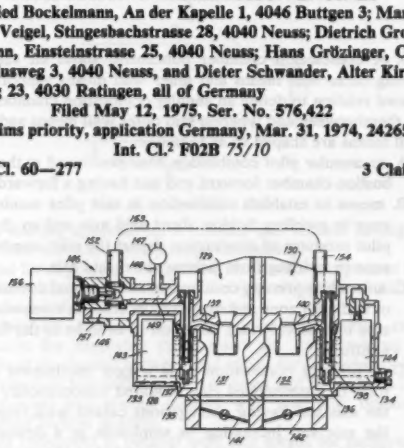
Wilfried Bockelmann, An der Kapelle 1, 4046 Buttgen 3; Martin W. Veigel, Stingesbachstrasse 28, 4040 Neuss; Dietrich Grossmann, Einsteinstrasse 25, 4040 Neuss; Hans Grözinger, Cornelisweg 3, 4040 Neuss, and Dieter Schwander, Alter Kirchweg 23, 4030 Ratingen, all of Germany

Filed May 12, 1975, Ser. No. 576,422

Claims priority, application Germany, Mar. 31, 1974, 2426594

Int. Cl.² F02B *75/10*

U.S. Cl. 60—277 **3 Claims**



1. In an auxiliary arrangement for the protection of an afterburner installation for the exhaust gases of an internal combustion engine having a regulating arrangement for the metering of a secondary air quantity, the improvement comprising: a source of fluid under pressure equal to or greater than atmospheric pressure; a switching installation instantaneously responsive to an emergency signal for switching off the fuel, said emergency signal representing an electrical impulse; means for initiating said electrical impulse upon exceeding a predetermined amount of unburned hydrocarbons; in the exhaust fuel reservoir means; fuel-air mixture forming means; and fuel conducting means between said fuel reservoir means and said fuel-air mixture forming means; control means linked to said source of pressure and actuatable by said emergency signal for releasing said fluid to contact the fuel and move the fuel by applying pressure thereto from said fuel conducting means and into said fuel reservoir means when said emergency signal is initiated; main jet means; said control means comprising a valve in a line connecting said source with a region of said mixture forming means, said region being downstream from said main jet means and being upstream from the exit point of the fuel-air mixture to said source of pressure; said valve comprising further means for synchronous connection of at least two units of said fuel-air mixture forming means to said source of pressure; said valve having facing springloaded valve flaps; bell cranks on said valve flaps; outlet sealing rings; and actuating plunger means for synchronously actuating said valve flaps, said actuating plunger means moving said valve flaps in direction for releasing said sealing rings so that said source of pressure communicates with the fuel at said region.

4,058,979

ENERGY STORAGE AND CONVERSION TECHNIQUE AND APPARATUS

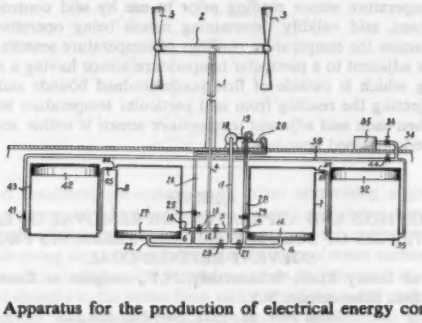
Fernand Germain, Bois-Thibault-Balata, 97200 Fort de France, Martinique, British W. Indies

Filed Oct. 1, 1976, Ser. No. 728,857

Claims priority, application France, Feb. 10, 1975, 75.30155

Int. Cl.² F15B *11/06*

U.S. Cl. 60—327 **4 Claims**



1. Apparatus for the production of electrical energy comprising:

wind driven compressor means, said compressor means including at least a first wind responsive rotor and producing pressurized air in response to rotation of said rotor;

first air storage reservoir means, said first reservoir means including a first piston;

first conduit means for selectively delivering pressurized air from said wind driven compressor means to the interior of said first reservoir means, said first conduit means being connected to said first reservoir means at a point located to a first side of said first piston when said first piston is in a deenergized state;

a source of pressurized liquid;

second conduit means for selectively coupling said source of pressurized liquid to the interior of said first reservoir means at the second side of said first piston to energize said first piston;

second air storage reservoir means, said second storage reservoir means including a second piston;

third conduit means for coupling the interior of said first reservoir means at said first side of said first piston to the interior of said second reservoir means at a first side of said second reservoir means piston;

generator means, said generator means including a pneumatic motor coupled to an electrical power generator; and

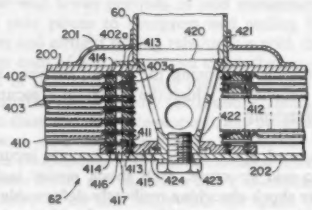
fourth conduit means for selectively coupling the interior of said second reservoir means at said first side of said second piston to said generator means.

4,058,980

HEAT EXCHANGERS

Karl Gustav Ahlen, Stockholm, Sweden, assignor to S.R.M. Hydromekanik Aktiebolag, Stockholm-Vallingby, Sweden

Continuation-in-part of Ser. No. 549,359, Feb. 12, 1975, abandoned. This application July 16, 1976, Ser. No. 705,899
Claims priority, application United Kingdom, Dec. 18, 1974, 54771/74
Int. Cl.² F16D 33/00; F28D 7/02
U.S. Cl. 60—337 27 Claims



1. A heat exchanger comprising:

a plurality of generally flat cooling cells arranged in stacked relationship to each other,

each cell including a pair of plates of heat conducting material sealed together around their outer peripheries and forming between the plates a fluid flow space, each cell further including an inlet and an outlet opening, each of which openings pass completely through the cell in a direction perpendicular to the main plane of the generally flat cells and each said opening communicating with the said flow space within its respective cell,

said cells being stacked with their respective inlet openings in fluid communication with each other to form an inlet passage and with their respective outlet openings in communication with each other to form an outlet passage, and including sealing means encircling each of said inlet and outlet passages between each cell to block off the space outside of the cells from said passages, whereby a fluid flows into the inlet passage and through the inlet openings into the said flow spaces within the cells and through the outlet openings to the outlet passage while another fluid contacts the exterior surface of each cell,

said cells being formed of only two plates which are shaped to form

a. the sealed outer periphery of the cell, and

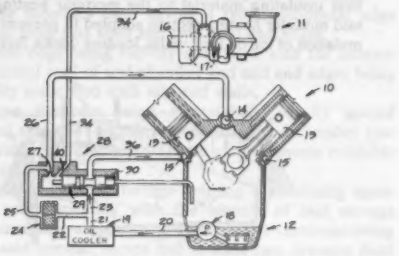
b. a spacing structure surrounding at least one of the inlet and outlet openings and urging the two plates apart in the vicinity of the openings while concurrently providing openings therepast for communication between the openings and the interior flow space of the cell.

4,058,981

LUBRICATING SYSTEM AND METHOD FOR TURBOCHARGED ENGINES

Ralph B. Henson, Creve Coeur, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed June 4, 1976, Ser. No. 693,235
Int. Cl.² F02B 33/40
U.S. Cl. 60—605 9 Claims



1. A lubricating system in combination with a turbocharged engine having crankshaft and rod bearings and pistons comprising,

first manifold means for communicating lubricant to crankshaft and rod bearings of said engine,

second manifold means for communicating lubricant to pistons of said engine,

a turbocharger mounted on said engine and having bearing means rotatably mounting a shaft therein,

pump means for communicating lubricant to said first and second manifold means and to said bearing means,

first conduit means for communicating lubricant from said pump means to said first manifold means,

second conduit means for communicating lubricant from said pump means to said second manifold means,

third conduit means for communicating lubricant from said pump means to said bearing means, and

direction control valve means, including expansible chamber means communicating with said first conduit means, connected to each of said first, second and third conduit means for automatically (a) communicating lubicant from said pump means to said first manifold means via said first conduit means and to said bearing means via said third conduit means upon start-up of said engine and for thereafter (b) communicating lubricant from said pump means to said first and second manifold means via said first and second conduit means, respectively, and to said bearing means via said third conduit means when the pressure of said lubricant exceeds a predetermined level in said expansible chamber means.

4,058,982

MODULAR HEATING SECTION

Ralph Wallace Wright, 118 Cedar Ave., Hudson, Quebec, Canada

Filed Sept. 15, 1975, Ser. No. 613,583
Int. Cl.² E02B 15/02
U.S. Cl. 61—1 R 10 Claims

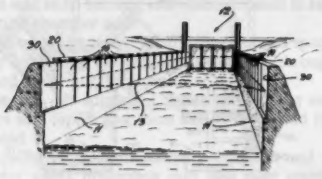
1. A modular heating section for use in association with navigation lock walls, loading docks, ferry slips, or the like, said modular heating section comprising:

a rigid panel having means for securing the section to a navigation lock wall, loading dock, or the like, at a location where ice formation occurs, the panel made from a heat conducting mortar mix;

the panel including heater means situated therein, the heater means adapted to distribute heat throughout the modular heating sections, the mortar mix providing a suitable bonding to the heater means while providing increased compressive strength to the modular heating section,

connector means operatively connected with the heater means, said connector means adapted to connect the heater means to an energy supply;

a rear surface of the modular heating section provided with a layer of heat insulating material, whereby heat transfer through the rear surface of the panel to the lock wall, loading dock, or the like is limited, the layer of heat insulating material provided on both sides thereof with a bonding layer in order to increase adhesion of the layer of heat insulating material to the modular heating section, said modular heating section adapted to prevent the accumulation of ice on lock walls, loading docks, ferry slips, or



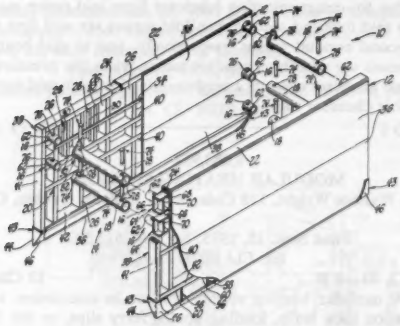
the like by providing heat to an outer surface of the modular heating section by means of the heater means, the outer surface of the section being provided with a smooth resistant surface to limit adherence of ice thereto, and to reduce wear thereof, said section including structural steel within the section intermediate the outer surface and the heater means, the structural steel adapted to strengthen the section and distribute heat generated by the heater means across the outer surface of the section, the modular heating section further including screening of conducting material intermediate the heater means and outer surface thereof, the heat conducting screening adapted to distribute heat to the outer surface of the section.

4,058,983

TRENCH SHORING ASSEMBLY WITH LIFTING ATTACHMENT

James L. Griswold, 513 Morningside Drive, Battle Creek, Mich. 49015

Filed Feb. 9, 1976, Ser. No. 656,148
Int. Cl.[2] E21D *5/00*
U.S. Cl. 61—41 A **4 Claims**



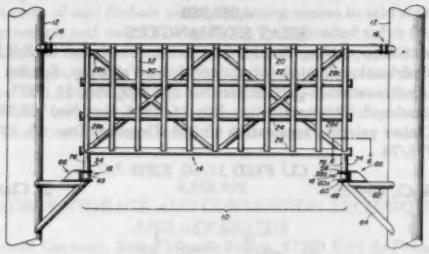
1. A trench shoring assembly comprising: a pair of spaced wall means, connecting means interconnecting said wall means including support means extending from said wall means and spreader means extending between said support means and connecting means removably connecting said spreader means to said support means, and lifting means supported by said connecting means for lifting said assembly upon being connected to a raising means, said lifting means including a plurality of closed-looped ring members surrounding said connecting means with at least a lifting portion thereof in spaced relation to said connecting means for connection to the raising means, said spreader means including at least one spreader pipe extending between said support means of said spaced wall means, said connecting means including pins connecting said spreader pipes to said support means and limiting movement of said ring members longitudinally of said spreader pipe when in engagement therewith.

4,058,984

MARINE CUSHIONING UNIT

Jay B. Weidler, Jr., Houston, and Charles Warren Stelly, Kingwood, both of Tex., assignors to Brown & Root, Inc., Houston, Tex.

Filed June 18, 1976, Ser. No. 697,411
Int. Cl.[2] E02B *3/22*
U.S. Cl. 61—48 **15 Claims**



1. Apparatus for cushioning the impact between a marine means and a structure to which the apparatus is securable, the apparatus comprising

an upright frame,

laterally spaced apart upper shock mounts securing said frame to said structure, each shock mount including a shear-like shock-absorbing resiliently-deformable member disposed intermediate said frame and said structure in an orientation in which it provides shear resistance to horizontal loading on the frame,

laterally spaced lower shock mounts securing said frame to said structure, each shock mount including a shear-type shock-absorbing resiliently-deformable member disposed to support at least a major portion of the vertical weight of said frame with compressive resistance and to provide shear resistance to horizontal loading on the frame.

4,058,985

PROTECTION OF METALLIC STRUCTURAL ELEMENTS AGAINST CORROSION

Orval E. Liddell, 333 Descanso Ave., Avalon, Calif. 90704

Filed July 19, 1976, Ser. No. 706,741
Int. Cl.[2] E02D *5/60*
U.S. Cl. 61—54 **2 Claims**

1. Apparatus for protectively encasing an installed metallic

columnar structural element of irregular horizontal cross-section against corrosion from water, air or a combination of water and air, comprising:

top and bottom filler block assemblies secured to vertically spaced portions of said structural element to fill the cavities thereof;

a split cylindrical back-up sheet means encircling said structural element in abutment with the exterior surface of said filler block assemblies and covering the edges of said elements, said back-up sheet means bring formulated so as to have a relaxed diameter less than the diameter defined by the outer diameter of said filler block assemblies;

a generally rectangular, synthetic plastic, pliable water and airtight encasement sheet of a length at least as great as the length of the portion of said structural element to be protected, said encasement sheet being wrapped about said back-up sheet means with its edges overlapping;

a pair of vertically extending, abutting pole pieces secured to the edges of said encasement sheet in a rolled-together water and airtight relationship with respect to the edges of said encasement sheet whereby said sheet is held against said back-up sheet means;

upper and lower sealing bands of compressible foam interposed between the outer edges of said filler block assemblies, the upper and lower ends of said back-up sheet means, and the upper and lower portions of said encasement sheet, with the upper and lower ends of said pole pieces terminating below and above said upper and lower sealing bands, respectively; and

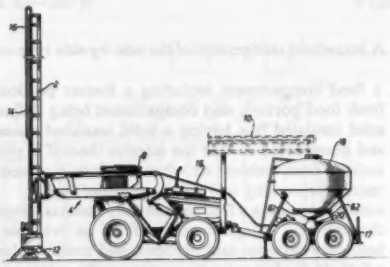
upper and lower wrapping bands extending around the upper and lower portions of said encasement sheet and said pole pieces to compress said sealing bands into a water and airtight sealing relationship with the upper and lower ends of said encasement sheet, the upper and lower ends of said back-up sheet means, and said filler block assemblies, said wrapping bands also retaining said encasement sheet and said pole pieces firmly upon said structural element, with said sealing bands and rolled-together pole pieces cooperating with said encasement sheet, said back-up sheet means and said filler block assemblies to prevent the entry of air and water into the space between said sheet and the portion of said structural element to be protected.

4,058,986

GROUND STABILIZING AGENT FEEDING DEVICE

Sven Granholm, Skelleftea, Sweden, assignor to Linden-Alimak AB, Skelleftea, Sweden

Filed May 21, 1975, Ser. No. 579,430
Int. Cl.² E02D *3/12*
U.S. Cl. 61—63 **13 Claims**



1. A ground stabilizing equipment comprising

a ground drilling assembly for injecting and mixing a pulverulent ground stabilizing agent into ground material,

a storage container for storing said ground stabilizing agent,

conduit means for said agent extending from said container to said ground drilling assembly,

feeding means associated with said container for feeding and portioning said agent into said conduit means,

said feeding means comprising a housing defining an essentially cylinder-shaped chamber,

said housing having two end walls,

a shaft rotatably journalled in said end walls coaxially within said chamber,

said shaft carrying a plurality of radially and axially extending vane members extending between said end walls,

said vane members each having a radial peripheral edge remote from said shaft and two axial end edges,

said radial edge being slidably associated with the internal cylindrical wall of said chamber and said end edges being slidably associated with said end walls,

said vane members being substantially equally spaced around said shaft and thereby dividing said chamber into a plurality of substantially equal compartments rotatable with said shaft,

said chamber housing further defining a stabilizing agent inlet communicating with the interior of said storage container and a stabilizing agent outlet communicating with said conduit means and at least two pressure fluid inlets,

each of said compartments during a first part of one revolution of said shaft communicating exclusively with said stabilizing agent inlet,

and each of said compartments during a second part of the same revolution communicating exclusively with said outlet and said pressure fluid inlets,

said stabilizing agent inlet spanning a sector of the cylindrical surface of said chamber substantially exceeding the peripheral distance between two adjacent vane members and being of the same order of magnitude as the axial length of said chamber,

said outlet being located diametrically opposite said stabilizing agent inlet and being smaller than said peripheral distance between two adjacent vane members,

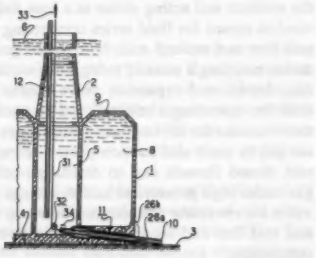
said two pressure fluid inlets being completely separate from said outlet and including at least one pressure fluid inlet located on each side of said outlet as seen when viewed in the axial direction of the chamber to provide a stirring and exhaust of the contents of the compartment in communication with said outlet by fluid passing from said pressure fluid inlets and through said compartment to said outlet.

4,058,987

METHOD AND DEVICE FOR CONNECTING SUB-MARINE PIPELINES TO A WEIGHT PLATFORM

Marcel Gerbault, Paris, France, and Robert Gair, London, England, assignors to Sea Tank Co. S.A., Chevilly Larue, France and Oceanic Contractors Inc., Panama City, Panama

Filed Feb. 9, 1976, Ser. No. 656,273
Claims priority, application France, Feb. 14, 1975, 75.04661
Int. Cl.² F16L *1/04;* E02D *27/38*
U.S. Cl. 61—86 **8 Claims**



1. A method for connecting a sub-marine pipeline to a riser pipe in a hollow concrete base of an offshore structure, said riser pipe extending along a substantially vertical hollow col-

umn and being connected to a work platform mounted on the base by means of one or more of said columns, the method comprising the steps of:

inserting the pipeline into the base through a submerged passage communicating with the interior and exterior of the hollow base up to the foot of said hollow column,

sealing the passage by means of annular inflatable seals located around the pipeline in the passage,

draining the water from said column and an associated cell portion of the base,

joining the pipeline to the riser pipe while both are in air,

refilling said column said associated cell portion of the base for ensuring a balance of pressures on either side of the passage;

breaking the sealing of the passage;

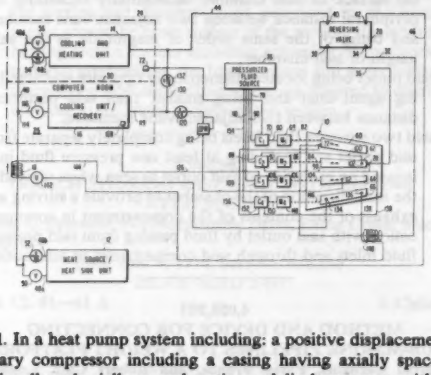
releasing the pipeline in the passage for permitting relatively free movement of the pipeline in the passage without stress.

4,058,988

HEAT PUMP SYSTEM WITH HIGH EFFICIENCY REVERSIBLE HELICAL SCREW ROTARY COMPRESSOR

David N. Shaw, Unionville, Conn., assignor to Dunham-Bush, Inc., West Hartford, Conn.

Filed Jan. 29, 1976, Ser. No. 653,568
Int. Cl.[2] F25B *29/00*
U.S. Cl. 62—160 **25 Claims**



1. In a heat pump system including: a positive displacement rotary compressor including a casing having axially spaced end walls and axially spaced suction and discharge ports within said casing open to the casing interior, rotor means mounted for rotation within said casing and forming during rotation closed threads sealed from said ports, and said heat pump system further including a first coil mounted within an enclosure to be conditioned for selective heating and cooling of said enclosure, a second coil external of said enclosure and within the ambient and acting either as a heat sink or heat source, and conduit means for fluid series connecting said compressor and said first and second coils in a closed loop with said conduit means carrying a mass of refrigerant working fluid for circulation therein and expansion valve means intermediate of said coils for operating a selected coil as a refrigerant evaporator, motor means for driving said rotor means for causing refrigerant gas to enter said suction port, to compress said gas within said closed threads and to discharge compressed refrigerant gas under high pressure at said discharge port, and a reversing valve for reversing connections between the compressor ports and said first and second coils respectively, the improvement comprising:

a pair of axially extending recesses within the casing in open communication with the rotor means closed threads,

a first slide valve axially slidable relative to said casing and sealably covering one recess with the interface of the slide valve being complementary to the casing confronted by the opening of said one recess,

a second slide valve axially slidable relative to said casing for sealably covering the opening of the other recess with the interface of the second slide valve being complementary to the casing confronted by the opening of said other recess,

said first slide valve being movable between extreme positions, in one of which said suction port is fully open and the other of which said suction port is closed, and said second slide valve being movable between extreme positions, in one of while the discharge port is fully open and the o..er in which the discharge port is closed.

means for axially shifting said first slide valve for varying the capacity of the compressor to meet heat pump system load variation,

said second slide valve carrying a port opening to the closed threads for sensing the compressed gas pressure within a closed thread immediately adjacent said discharge port, and

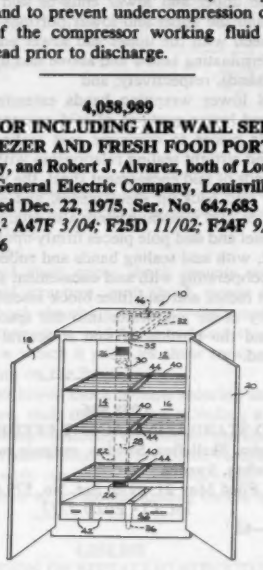
means for comparing the closed thread pressure just before opening to said discharge port with said compressor discharge pressure at the compressor discharge port and for shifting said second slide valve axially to equalize these pressures and to prevent undercompression or overcompression of the compressor working fluid within the closed thread prior to discharge.

4,058,989

REFRIGERATOR INCLUDING AIR WALL SEPARATING THE FREEZER AND FRESH FOOD PORTIONS

Julius B. Horvay, and Robert J. Alvarez, both of Louisville, Ky., assignors to General Electric Company, Louisville, Ky.

Filed Dec. 22, 1975, Ser. No. 642,683
Int. Cl.[2] A47F *3/04*; F25D *11/02*; F24F *9/00*
U.S. Cl. 62—256 **7 Claims**



1. A household refrigerator of the side-by-side type comprising:

a. a food compartment including a freezer portion and a fresh food portion, said compartment being defined by a solid insulated box having a solid insulated access door and constructed so that the interior thereof is physically isolated from ambient air when the door is closed;

b. means for cooling said freezer portion; and

c. means for passing a first substantially laminar stream of air through said compartment to form an invisible planar boundary between said portions, said means including:

a first air conduit extending substantially across one of the walls of said compartment to define an interface between the planar boundary and said one of the walls, said first air conduit having at least one opening for directing the first laminar stream of air across said compartment to an opposed wall of said compartment,

a first air-receiving element extending substantially across said opposed wall to define an interface between the

planar boundary and said opposed wall, said first receiving element serving to receive said first laminar stream of air, and

means for recirculating air from said first receiving element to said first air conduit.

4,058,990

DEVICE FOR SUPPORTING THE DRIVE SHAFT OF AN AGRICULTURAL MACHINE FOR COUPLING TO A POWER TAKE-OFF SHAFT

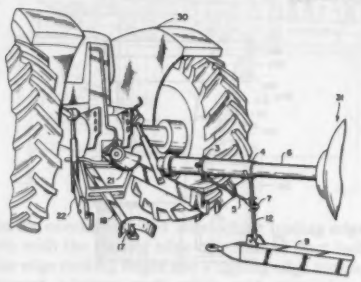
Wilhelm von Allwörden, Lohmar, Germany, assignor to Jean Walterscheid GmbH, Lohmar, Germany

Filed Aug. 26, 1976, Ser. No. 717,609

Claims priority, application Germany, Aug. 26, 1975, 2537841

Int. Cl. F16d *3/00*

U.S. Cl. 64—1 S 7 Claims



1. A device for supporting the drive shaft of an agricultural machine for coupling to the power take-off shaft of a tractor comprising a drive shaft on an agricultural machine and a tubular casing enclosing said drive shaft, means on said drive shaft and a power take-off shaft of a tractor for aligning and coupling the shafts with respect to each other, a hitch bar on the agricultural machine, a strut having one end pivotally mounted on said hitch bar to pivot upon said hitch bar in the axial direction thereof, means on the other end of said strut for engaging and supporting the drive shaft, and a guide member having one end pivotally connected to said tubular casing and the other end pivotally connected to said strut.

4,058,991

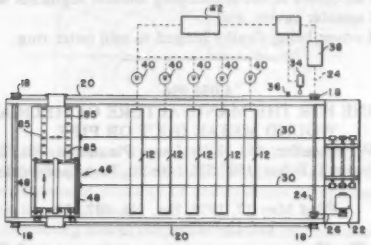
DYEING MACHINE

John K. McCollough, Spartanburg, S.C., assignor to Milliken Research Corporation, Spartanburg, S.C.

Filed Nov. 29, 1976, Ser. No. 745,657

Int. Cl.² D06B *1/02, 11/00*

U.S. Cl. 68—205 R 9 Claims



1. Apparatus for applying dyestuff to a sample fabric to dye a portion of same comprising: a frame, a dye jet gun bar having a row of dye emitting orifices therein mounted transverse to said frame, means to supply liquid dyestuff to said dye emitting orifices to direct the dye downwardly in plural streams toward a fabric moved thereunder and a carrier means movably mounted in said frame under said gun bar adapted to support the sample fabric, said carrier means having a carrier member and a carrier carriage mounted thereon and movable transverse to said carrier member and means on said carrier carriage to position said carrier carriage on said carrier member.

4,058,992

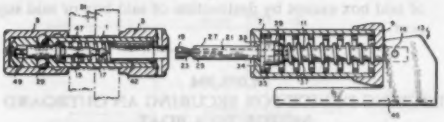
BARREL TYPE LOCK AND KEY

Anker J. Nielsen, Jr., 410 Bailey Road, Holden, Mass. 01520

Filed July 26, 1976, Ser. No. 708,837

Int. Cl.² E05B *67/36*

U.S. Cl. 70—34 8 Claims



1. The combination in a barrel type lock and key therefor of a lock barrel, locking elements protrudible laterally therefrom, a plunger therein for extruding such elements and having a knob on its end, a key having a relatively movable plunger to enter axially into the barrel, means on the latter plunger to make positive contracting gripping engagement with the knob on the plunger which extrudes the locking elements, and cam means for actuating the gripping plunger.

4,058,993

LOCK BOX

James H. Stubbings, Rockville, Md., assignor to Potomac Applied Mechanics, Inc., Bethesda, Md.

Filed Jan. 21, 1977, Ser. No. 760,955

Int. Cl.² E05B *73/00*

U.S. Cl. 70—58 14 Claims

1. A theft-preventing container for an appliance comprising

a. a metal box for receipt of an appliance therein, said box having (i) a plurality of walls, at least one wall having an access opening formed therein allowing access to controls of an appliance within said box, and (ii) one of said box walls being movable to allow removal of an appliance within the box from said box,

b. means for latching said movable box wall to the rest of said box to prevent unauthorized movement of said movable box wall, said latching means comprising (i) a first plurality of spaced tubular members having aligned bores and extending from said movable wall, (ii) a second plurality of spaced tubular members having aligned bores and extending from a wall of said box distinct from said movable wall, said second plurality of tubular members being

spaced apart in a manner to receive said first plurality of spaced tubular members therebetween with bores of said first and second plurality of members aligned, (iii) a removable hardened metal latching bolt having cross-sectional dimensions generally corresponding in shape to the shape of said bores in said first and second plurality of spaced tubular members for receipt thereby to hold said first and second plurality of bores in alignment, and (iv) a locking means for holding said latching bolt in place received by said first and second plurality of tubular members to prevent relative movement between said tubular members, said locking means including a key-release means, and

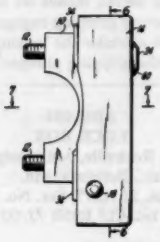
c. means for attaching said box to a stationary support, having a larger area than said box, so that said box may not be removed from said support from a location exterior of said box except by destruction of said box or said support.

4,058,994

LOCKING DEVICE FOR SECURING AN OUTBOARD MOTOR TO A BOAT

Louis Coppola, 2023 Neptune Ave., Brooklyn, N.Y. 11224

Filed Dec. 31, 1975, Ser. No. 645,879
Int. Cl.² F16B *41/00*
U.S. Cl. 70—232 **3 Claims**



1. A locking device for locking an outboard motor against removal from a boat wherein the motor is secured to the boat by a clamp and bolts, the clamp having holes therein and the bolts having boltheads thereon whereby the bolts pass through the holes and into a mounting on the boat so that the boltheads firmly hold the clamp in place, said locking device comprising:

a casing having a rear wall, top and bottom walls, and two side walls, said rear wall having holes therein for alignment with the holes in the clamp and adapted to receive the bolts prior to their passing into the clamp such that said rear wall is secured in abutting relationship with the clamp and the boltheads are situated internally of said casing, said casing having a length greater than length of the clamp to substantially enclose the clamp;

a cover having a front wall, top and bottom walls, and two side walls to define an open box, said cover being larger than said casing to receive said casing in said cover, said rear wall of said casing being spaced from said front wall of said cover by said top, bottom and side walls of said casing in a closed position of said cover;

pin means disposed between said side walls of said casing and said cover for pivotally connecting said cover to said casing for moving said cover between said closed position and an opened position, the clamp and the boltheads being accessible when said cover is in said opened position, said pin means being located at end portions of said casing and said cover adjacent to said bottom walls of said casing and said cover;

said top wall of said cover closely fitting said top wall of said casing in said closed position, said bottom wall of said cover being spaced apart from said bottom wall of said casing in said closed position for permitting pivotal movement of said cover to said opened position;

a pair of aligned substantially identical longitudinal slots, one of said slots being provided in each of said side walls of said casing at an opposite end portion thereof remote from said pin means; and

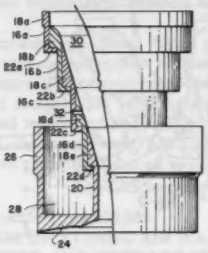
locking means for securing said cover to said casing when said cover is in said closed position, said locking means including a rotatable bar for transversely extending through both of said slots to provide a locked position.

4,058,995

LOCK DE-ICER

Cecil Greaves, 168-42 127th Ave., Jamaica, N.Y. 11434

Filed Aug. 24, 1976, Ser. No. 717,036
Int. Cl.² E05B *17/00*
U.S. Cl. 70—431 **1 Claim**



1. A lock de-icer comprising:

a. a plurality of telescoping annular segments;

b. said segments, when extended forming a hollow generally conical channel;

c. one of the end segments of said plurality of annular segments having an outward directed flange of resilient material attached at the outer extremity thereof, said outward directed flange being deformable whereby it may be deformed to sealingly abut the curved surface of a vehicle surrounding the vehicle door lock;

d. an air release hole providing open communication for air from the inside to the outside of one of said telescoping annular segments;

e. an outer ring attached to the perimeter of said outward directed flange, said outer ring being coaxial with said one of the end segments and forming between itself and said one of the end segments an annular cavity in which all others of the telescoping annular segments may be contained;

f. a cover adapted to sealingly fit over the end of said outer ring remote from said outward directed flange and to hold said all others of the telescoping annular segments within said annular cavity, and

g. said cover being flexiby hinged to said outer ring.

4,058,996

MACHINE FOR THE MANUFACTURE OF HELICALLY WOUND METAL DUCT OR PIPE

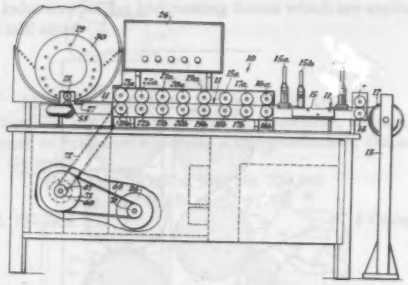
Claude W. Schaeffer, 461 Holly Lane, Plantation, Fla. 33317, and Martin T. Baker, 1507 SE. 14th St., Fort Lauderdale, Fla. 33316

Filed May 17, 1976, Ser. No. 687,309
Int. Cl.² B21C *37/12*
U.S. Cl. 72—49 **2 Claims**

1. An apparatus for manufacturing bendable duct from a ductile strip wherein:

a plurality of strip guide rollers mounted upon a removeable plate disposed in a circular array define the diameter of the formed duct, and whereby duct of different diameters can be formed by interchanging said removeable plates

with strip guide rollers having a grooved surface for receiving corrugations in the strip, the grooves in each roller being spaced relative to adjacent roller to guide said strip in a helical path and whereby all stages of fabrication are synchronously driven together from a common drive means, the improvement comprising a plurality of different increasing adjacent diameter pairs of strip corrugating roller dies mounted adjacent each other and being disposed in an array which receives a ductile strip for corrugating said strip longitudinally, said pairs of corrugating roller dies being synchronously drive at a constant angular rotational rate; and



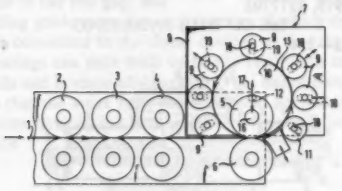
means for overlapping and interlocking leading edge of said strip with the trailing edge of a formed duct including a strip edge tucking finger and a trailing edge tucking finger disposed adjacent each other, said strip edge tucking finger having a deforming wall disposed angularly with respect to said first edge to deform said strip edge at an angle relative to the strip edge plane and a vertical wall disposed below said deforming wall to provide a space between said deforming wall and the strip mounting surface, said overlapped and interlocked edges thereafter being compressed into a tight duct seam.

4,058,997

APPARATUS FOR MANUFACTURING TUBES

Emil Siegwart, 6 Michael Blatter Strasse, Sulzbach-Neuweiler, Germany

Continuation-in-part of Ser. No. 630,256, Nov. 10, 1975, abandoned. This application Apr. 4, 1977, Ser. No. 784,521
Claims priority, application Germany, Nov. 13, 1974, 2453876
Int. Cl.² B21C *37/12*
U.S. Cl. 72—50 **11 Claims**



2. In an apparatus for producing a tube from a continuous strip travelling at a first velocity by helically coiling said strip into a continuous plurality of convolutions comprising,

a. an apparatus body,

b. connecting means adapted to receive said continuous strip and join an edge portion thereof with an adjacent edge portion of a just formed convolution into a joint, said means including an inner and outer connecting roller rotatively carried by said body to intersect tangentially with an inner and outer peripheral surface of said tube, and

c. driving means connected to said connecting rollers to drive said rollers at peripheral velocities differing from said first velocity of said strip and a rotational velocity of said convolutions.

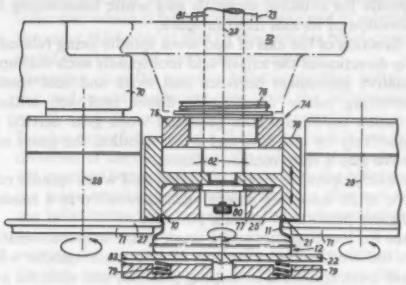
wherein characteristics of said joint are controlled in relation to a magnitude of said velocity differences.

4,058,998

CONTAINERS

Jozef Tadeusz Franek, Chorleywood, and Peter Henry Doncaster, Harrow, both of England, assignors to Metal Box Limited, England

Filed Aug. 31, 1976, Ser. No. 719,251
Int. Cl.² B21D *19/06*
U.S. Cl. 72—84 **19 Claims**



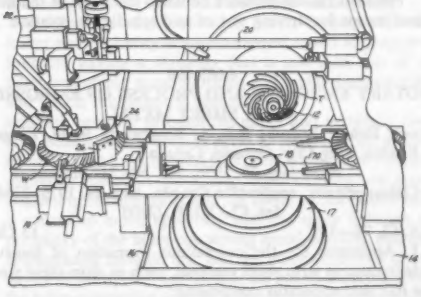
1. A method of forming a cylindrical metal can body of the type having an open end with a peripheral end flange about the open end of the can body and a neck portion of reduced diameter merging with said flange, said method comprising the steps of supporting the can body in axial compression and then while so holding the can body in axial compression applying a radial force inwardly on the can body deforming the can body radially inwardly adjacent the can body open end to thereby simultaneously inwardly neck the can body and axially shorten the can body.

4,058,999

GEAR ROLLING EQUIPMENT

Leonard A. Gabriele, Warren, Mich., assignor to Lear Siegler, Inc., Santa Monica, Calif.

Filed Feb. 9, 1976, Ser. No. 656,255
Int. Cl.² B21D *43/00*
U.S. Cl. 72—102 **44 Claims**



1. Apparatus for roll finishing an annular toothed work gear having an axis of rotation and a central opening coaxial therewith by rolling in tight mesh with a toothed tool gear conjugate to the work gear, which apparatus comprises

a rotary tool spindle having an axis of rotation and means on said tool spindle for mounting a tool gear thereon in fixed angular position relative to said tool spindle,

mounting means for said tool spindle mounting said tool spindle for rotation about its axis while maintaining the direction of its axis fixed in space,

selectively operable means for fixing said tool spindle against rotation relative to its mounting means in a predetermined angular position,

a rotary work spindle having an axis of rotation and a work support portion having a part receivable in the central opening of a work gear and adapted to retain a work gear against rotation on said work spindle and to sustain forces developed by rolling the work gear and tool gear in tight mesh under high pressure,

mounting means for said work spindle mounting said work spindle for rotation about its axis while maintaining the direction of its axis fixed in space,

the direction of the axis of said work spindle being related to the direction of the axis of said tool spindle such that upon relative movement between said work and tool spindle mounting means resulting in direct approach without rotation between a tool gear and work gear carried respectively by said tool and work spindles, the gears may move into a fully meshed relation,

selectively operable means for fixing said work spindle relative to its mounting means against rotation in a random angular position in loading position,

means for locating successive work gears in spaced relation to the work support portion of said work spindle while said work spindle is in loading position, and with the axes of rotation of each work gear in alignment with the axis of rotation of said work spindle and in a predetermined angular rotational position such that the teeth of the work gear and tool gear will mesh upon direct approach therebetween,

means for effecting relative movement between a work gear and said work spindle while maintaining both said work spindle and the work gear against rotation about their axes to position the work gear on said work spindle in the aforesaid angular rotational position,

selectively operable means for fixing the work gear on said work spindle against rotation thereon to maintain its predetermined angular position,

means for effecting relative movement between said work and tool spindle mounting means while both of said spindles are maintained against rotation to cause direct approach between the work and tool gears to bring the gears into tight mesh,

means for thereafter releasing both of said spindles for rotation,

the means for effecting relative movement between said work and tool spindle mounting means being operable to provide additional relative movement therebetween to establish rolling pressure between the teeth of the gears, and means for driving one of said spindles in rotation.

4,059,000

ROTARY EMBOSSER AND PROCESS OF EMBOSSING STRIP SHEET METAL

Ernest Robert Bodnar, R.R. 1, Kingsworth Road, Kingcross Estates, King City, Ontario, Canada

Filed Aug. 25, 1976, Ser. No. 717,659

Claims priority, application Canada, Aug. 29, 1975, 234609

Int. Cl.[2] B21D *22/08*

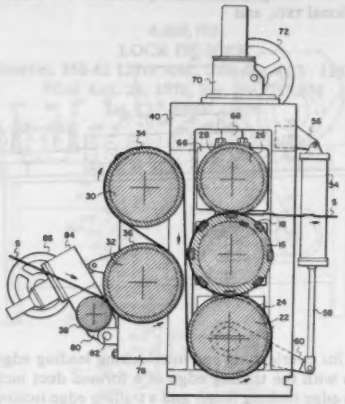
U.S. Cl. 72—197 **13 Claims**

1. Apparatus for the continuous formation of transverse indentations in strip sheet material, such as strip sheet steel or the like said apparatus comprising;

male die roll means having a plurality of transverse upstanding male die formations thereon and adapted to be driven at a predetermined speed;

a first female roll member engaging said male die roll means under pressure and having a resilient surface deformable by indentation of said male die formations of said male die roll means into said resilient surface, said strip material passing between said male die roll means and said first female roll member and being thereby indented into said resilient surface;

a second female roll member having a resilient surface which is in pressurized contact with said male die roll means at a point thereon spaced from said first female roll member downstream with respect thereto, said resilient surface being deformed by pressure between said second female



roll member and said male die roll means, and said strip material passing therebetween, said resilient surface applying pressure to said strip material, thereby holding the strip material in position against said male die roll means, around a predetermined arc thereof, and maintain said male die formations in contact therewith all around said arc, and,

upstream tension roll means for engaging said strip material prior to passage between said male die roll means and said first female roll member.

4,059,001

MILL FOR ROLLING CONTINUOUSLY CAST INGOT

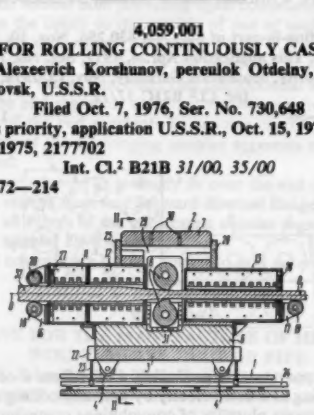
Evgeny Alexeevich Korshunov, pereulok Otdelny, 5a, kv. 29, Sverdlovsk, U.S.S.R.

Filed Oct. 7, 1976, Ser. No. 730,648

Claims priority, application U.S.S.R., Oct. 15, 1975, 2177701; Oct. 15, 1975, 2177702

Int. Cl.[2] B21B *31/00, 35/00*

U.S. Cl. 72—214 **4 Claims**



1. A mill for rolling a continuously cast ingot, said mill rolling a casting intermittently, said mill having a movable mill stand set up on a stage and travelling along slideways mounted on a foundation, said mill stand comprising: a bottom-mill separator installed on said stage; two housings, each of which incorporating braces, said housing being fastened on said bottom-mill separator; a top-mill separator holding said housings together; grooved mill rolls disposed intermediate of said

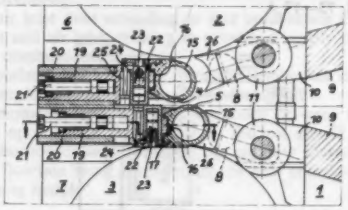
housings and having roll necks mounted in chock bearings, said chock bearings being located in apertures of said housings; hydraulic drives connected to the necks of said grooved rolls; gear wheels meshed with each other and connected to the necks of said grooved rolls; and at least two pairs of inductors mounted between the braces of said housings on said bottom-mill separator of said mill stand, said inductors being arranged such that in each pair one inductor is above and the other inductor is below the casting being rolled, the inductors being on both sides of said mill rolls , said pair of inductors inducing in said casting to be rolled inductive currents, which heat said casting being rolled, and electromagnetic forces, which create in said inductors pulling and pushing forces which are applied to said mill stand.

4,059,002

MULTI-ROLL ROLLING MILL STAND

Hans Rommen, and Erich Stoy, both of Dusseldorf, Germany, assignors to Schloemann- Siemag Aktiengesellschaft, Dusseldorf, Germany

Filed Oct. 20, 1976, Ser. No. 734,040
Int. Cl.² B21B *13/02, 31/08*
U.S. Cl. 72—238 **6 Claims**



1. A multi-roll rolling mill stand comprising:
a housing;
two driven back-up rolls;
two work rolls each driven by frictional engagement with a respective one of the back-up rolls and which are offset from the perpendicular axial plane of the back-up rolls;
a roll gap formed between the work rolls;
bearings mounting the ends of the work rolls;
intermediate rolls and support rollers supporting the work rolls on one side of the work roll gap;
thrust devices supporting the work roll bearings on the other side of the roll gap; and
a sliding guide arrangement by means of which the bearings are connected to the thrust devices so that the work roll bearings can slide both vertically relative to the back-up rolls and horizontally parallel to the back-up roll axes and so that the work rolls can be moved horizontally by the thrust devices towards and away from the intermediate rolls.

4,059,003

PROCESS FOR PRODUCING HEAVY-DUTY HIGH-PRESSURE FERROUS METAL CUP-SHAPED PRODUCTS HAVING A CYLINDRICAL BARREL

Charles H. Moore, 645 Matanzas Court, Fort Myers Beach, Fla. 33931

Continuation-in-part of Ser. No. 519,044, Oct. 29, 1974, abandoned. This application Dec. 29, 1975, Ser. No. 644,862
Int. Cl.² B21C *23/18, 23/20*
U.S. Cl. 72—256 **1 Claim**

1. The process of forging a large heavy-duty, seamless high-pressure resistant, self-reinforcing cup-shaped ferrous-metal product with a cylindrical barrel of substantial wall-thickness, in a forging press possessing the usual lower stationary element and the usual upper vertically movable element, said process including

a. placing on the lower stationary element of the forging press a vertically disposed cylindrical female forging die member having a closed bottom,

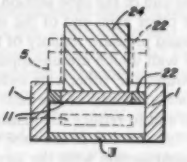
b. placing within the vertically disposed cylindrical female forging die member a steel billet heated to forging temperature,

c. placing on top of the heated steel billet an annular billet-contacting metal-working and metal-displacing ring having an external diameter which is slightly less than the diameter of the bore of the cylindrical female forging die member,

d. positioning within the open center of the annular billet-contacting metal-working and metal-displacing ring a billet-contacting metal-working and metal-displacing metallic disc which is fairly closely fitting and of substantially the same thickness as that of the annular billet-contacting metal-working and metal-displacing ring,

e. disposing atop the annular billet-contacting metal-working and metal-displacing ring and the billet-contacting metal-working and metal-displacing metallic disc a round forging press follower of a diameter which is less than the diameter of the die cavity of the cylindrical female forging die member but sufficient to cover both the billet-contacting metal-working and metal-displacing disc and most of the billet-contacting metal-working and metal-displacing annular ring,

f. moving the upper and vertically movable element of the forging press downwardly to thereby press the round forging press follower onto the round billet-contacting



metal-working and metal-displacing metallic disc and the billet-contacting metal-working and metal-displacing annular ring and, through said metallic disc and said annular ring, exert forging pressure onto the top of the heated billet, whereby the billet spreads out until the outer periphery thereof makes contact with the inner surface of the die cavity of the cylindrical female forging die member,

g. arresting the downward movement of the upper and vertically movable element of the forging press when the immediately aforementioned condition takes place,

h. removing the aforementioned round forging press follower and replacing it with a second round forging press follower having a diameter that is less than that of the billet-contacting metal-working and metal-displacing disc and which is concentric therewith,

i. applying pressure through the upper and vertically movable element of the forging press to the top of the second-named round forging press follower, whereupon the latter depresses the billet-contacting metal-working and metal-displacing metallic disc, and the metal of the heated billet is caused to move upwardly into the space between the periphery of the billet-contacting metal-working and metal-displacing metallic disc and the inner surface of the die cavity of the cylindrical forging die member during which the billet-contacting annular metal-working and metal-displacing annular ring moves upwardly on top of the back-extruded metal,

j. continuing the immediately aforementioned movements until the metal of the heated work-piece below the billet-contacting metal-working and metal-displacing metallic

disc is no less than approximately three inches thick and at which time the bottom of the round metal-working and metal-displacing disc will have become welded to the metal of the highly heated billet with which it is in contact,

k. removing the billet-contacting metal-working and metal-displacing annular ring from the top of the back-extruded work-piece formed of said heated billet and,

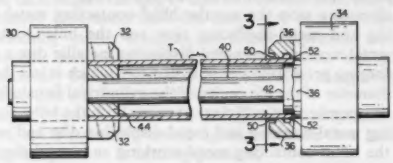
l. removing the work-piece formed from the vertically disposed cylindrical female forging die member.

4,059,004

METHOD OF FORMING HELICALLY CORRUGATED TUBING

Robert W. Perkins, Hamden, Conn., assignor to Spiral Tubing Corporation, New Britain, Conn.

Filed Feb. 20, 1976, Ser. No. 659,845
Int. Cl.² B21D *11/14*
U.S. Cl. 72—299 **17 Claims**



1. A method of helically corrugating a section of deformable tube comprising the steps of:

providing a section of deformable tube having a cylindrical wall without deformations between the axial tube ends;

twisting one axial end of the tube section about the tube axis relative to the other axial end of the section;

generating localized pressure radially of the cylindrical wall at areas of the wall which are unsupported and which are distributed around the otherwise cylindrical tube while twisting the one axial end of the tube section relative to the other axial end to reduce the resistance to torsion and initiate radial deformation of the tube wall at the pressurized areas in conjunction with the step of twisting; and

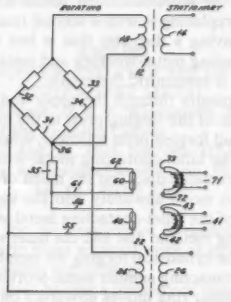
controlling the axial length of the tube section during the step of twisting to cause the radial deformations to grow from the pressurized areas axially along a selected helical path in the cylindrical tube wall.

4,059,005

ROTARY TRANSFORMER SHUNT CALIBRATION

Albert E. Brendel, Lake Orion, and Myron P. Sedman, Troy, both of Mich., assignors to Lebow Associates, Inc., Troy, Mich.

Filed June 24, 1976, Ser. No. 699,553
Int. Cl.² G01L *25/00*
U.S. Cl. 73—1 B **7 Claims**



1. In a rotary transformer transducer system or the like including a rotatable shaft having a transducer and a rotor member each secured thereto for rotation therewith and a stationary member including a stator member, said rotor member and said stator member for coupling electrical energy therebetween without physical contact, the improvement of a selectively operable shunt calibration system comprising:

impedance means secured to said rotatable shaft for rotation therewith;

magnetically actuated switch means mounted on said rotatable shaft for rotation therewith, said magnetically actuated switch means operable for coupling said impedance means across at least a first part of said transducer; and

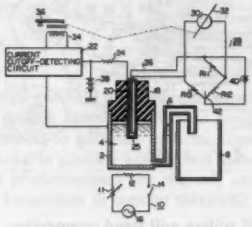
switch actuating means including at least one magnet mounted on said stationary member for operating said magnetically actuated switch means, said actuating means being free of physical contact with said switch means.

4,059,006

LIQUID QUALITY-EVALUATING APPARATUS

Masumi Mizutani, Gifu; Hiromichi Hata, and Masasuke Shimazaki, both of Yokohama, all of Japan, assignors to Showa Industries Co., Ltd., Gifu; Fujisoku Electric Co., Ltd., Kawasaki and Kitoku Co., Ltd., Tokyo, all of, Japan

Filed Dec. 16, 1976, Ser. No. 751,040
Claims priority, application Japan, Dec. 22, 1975, 50-171939[U]; Dec. 22, 1975, 50-171940[U]
Int. Cl.² G01N *25/08*
U.S. Cl. 73—17 A **9 Claims**



1. A liquid quality-evaluating apparatus for determining the boiling point or vapor lock point of a liquid, comprising:

a vessel made of heat-conductive and electrically conductive material and having an opening to receive a prescribed amount of a sample liquid whose boiling point or vapor lock point is to be determined;

a discharge siphon, one end of which is disposed at the bottom of the vessel for communication with the liquid in the vessel and the other end of which extends outside of the vessel, for removing the liquid from the vessel after its quality has been evaluated;

a removable cover made of heat-insulating material to substantially airtightly close the opening of the vessel;

heating means for heating the vessel and the liquid in the vessel;

an electrode, one end of which is removably received in the vessel for contact with the sample liquid whose boiling point is to be determined and the other end of which is fixed to the removable cover;

a current cutoff-detecting circuit including at least the electrode, the vessel and the sample liquid received in the vessel to form a closed electrical circuit and adapted to issue an output signal when the sample liquid ceases to contact the electrode, thereby detecting a predetermined level of the liquid in the vessel;

means for detecting the temperature of the sample liquid in the vessel and for generating electrical signals corresponding to the detected temperature; and

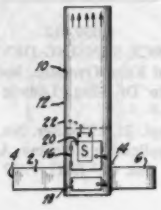
display means coupled to the temperature detecting means for indicating in response to said electrical signals whether the sample liquid in the vessel has a higher or lower boiling point than a reference temperature.

4,059,007

CONVECTIVE AIR FLOW DYNAMIC CALORIMETER

Bernard Miller, Princeton, N.J.; J. Ronald Martin, Easton; Charles H. Meiser, Jr., Yardley, both of Pa.; Harold W. Lambert, Pennington, and Harry Buvel, Trenton, both of N.J., assignors to Textile Research Institute, Princeton, N.J.

Filed Feb. 11, 1977, Ser. No. 767,730
Int. Cl.² G01K *17/00*
U.S. Cl. 73—190 R 12 Claims



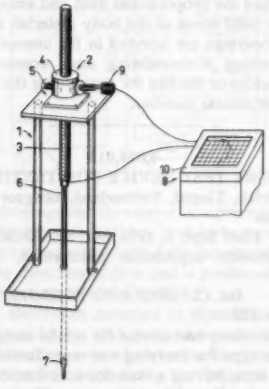
1. A convective air flow dynamic calorimeter, for measuring the heat emission of a burning sample, comprising:
   a. a combustion chamber for holding therein a sample to be tested for burning characteristics thereof;
   b. an air inlet opening positioned at the external ambient environment;
   c. an air inlet duct extending to said combustion chamber from said air inlet opening to provide a supply of air to said combustion chamber;
   d. air outlet means extending from said combustion chamber to provide a path of exhaust therefrom; and
   e. anemometer sensing means positioned between said air inlet opening and the location of the test sample in said combustion chamber to sense the air flow therethrough said flowrate being a measure of the heat emission of the burning sample.

4,059,008

METHOD AND DEVICE FOR PORE PRESSURE SOUNDING

Bengt-Arne Torstensson, 34 Hojdvagen, Vallentuna, Sweden (S-186 00)

Filed May 28, 1976, Ser. No. 691,104
Claims priority, application Sweden, May 30, 1975, 7506205
Int. Cl.² G01N *3/00*
U.S. Cl. 73—38 5 Claims



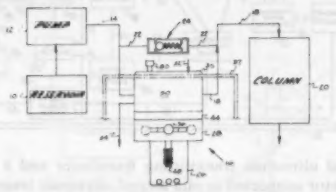
1. A method of determining the characteristics of succesive layers of soil using a sounding probe of the type having a pressure transducer, a filter separating the transducer from soil layers surrounding the sounding probe and means for monitoring the output of the pressure transducer, comprising the steps of: driving said sound probe through a body of soil at a speed sufficient to produce transient variations in the transducer output corresponding to transient variations in the generated pore pressure of the soil encountered by the probe during movement; simultaneously with said driving, recording the output of said pressure transducer as a function of the depth of said sounding probe in said soil.

4,059,009

LIQUID CHROMATOGRAPHY SYSTEM

Dean M. Ball, Norcross, and Warren P. Hendrix, Lawrenceville, both of Ga., assignors to Micromeritics Instrument Corporation, Norcross, Ga.

Filed Sept. 10, 1976, Ser. No. 722,163
Int. Cl.² G01N *31/08*
U.S. Cl. 73—61.1 C 9 Claims



1. In liquid chromatography apparatus for analyzing liquid samples including a liquid-separation column, pump means and conduit means for continuously delivering a carrier liquid to said column under a predetermined high pressure, and means positioned in said conduit means between said pump means and column for introducing a predetermined amount of liquid sample into the pressurized carrier liquid for passage into the column; the improvement wherein said sample introducing means comprises means for storing a determined amount of liquid sample; a sample injection valve connected to said sample storing means and to said conduit means and including means positionable for alternatively communicating (1) said storing means with a source of liquid sample and a discharge to waste, (2) said pump means with said column through said sample storing means, and (3) said pump means to a discharge to waste through said sample storing means; and pressure-actuated means positioned in said conduit means in parallel with said sample injection valve for passing carrier liquid directly from said pump means to said column only upon a predetermined small pressure increase above said predetermined high pressure occurring in said conduit means upstream of said pressure-actuated valve to thereby maintain substantially constant high pressure flow of carrier liquid to said column..

4,059,010

ULTRASONIC INSPECTION AND DIAGNOSIS SYSTEM

Thomas D. Sachs, 34 S. Williams St., Burlington, Vt. 05401

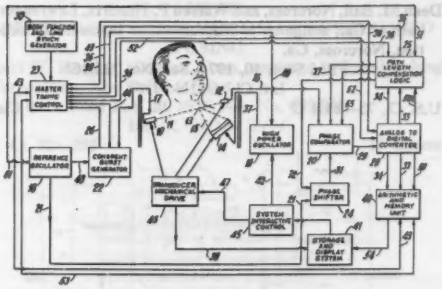
Continuation-in-part of Ser. No. 402,163, Oct. 1, 1973, which is a continuation-in-part of Ser. No. 185,306, Sept. 30, 1971, Pat. No. 3,771,355. This application June 23, 1975, Ser. No. 589,031
The portion of the term of this patent subsequent to Nov. 13, 1990, has been disclaimed.
Int. Cl.² G01N *29/04*
U.S. Cl. 73—596 8 Claims

1. A system for ultrasonic inspection of non-moving substance such as a log, said system including
   means to produce a collimated ultrasonic sensing beam directed through said substance, said sensing beam means including an ultrasonic transmitting transducer to produce said collimated beam, an oscillator which is a reference source of continuous waves of ultrasonic frequency, and gating means connected between said source and said

beam transmitting transducer to produce coherent bursts of oscillations which are discrete trains of oscillations at ultrasonic frequency to be fed to said beam transmitting transducer from said oscillator,

an ultrasonic receiving transducer positioned to receive said sensing beam,

a phase comparison means connected to said receiving transducer and to said reference oscillator to respond to phase changes in the sensing beam caused by transmission through said substance,



a second ultrasonic transmitting transducer and a second oscillator connected to said second ultrasonic transmitting transducer, said second transmitting transducer positioned to heat said substance along the path of said sensing beam through said substance; and

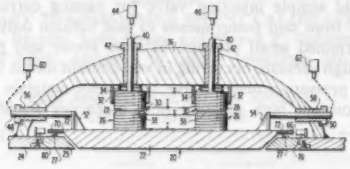
timing means to control said sensing beam means and said second transmitting transducer so that they are activated in sequence and not simultaneously to compare the phase changes in the sensing beam through said substance before and after said ultrasonic heating.

4,059,011

METHOD AND FORCE DETERMINING APPARATUS FOR ICE BREAKING VESSELS

Joseph M. Reiss, 1757 Harvard St., NW., Washington, D.C. 20009

Filed Aug. 18, 1975, Ser. No. 605,552
Int. Cl.[2] G01L *5/16*; G01N *19/02*
U.S. Cl. 73—133 R **18 Claims**



1. Apparatus for providing data related to frictional forces experienced on the hull of a vessel as the vessel passes through ice comprising:

a generally planar plate;

means for suspending said plate in an aperture in the hull of the vessel generally flush therewith and at a location on the hull which contacts the ice through which the vessel passes, said plate being maintained at a reference position by said suspending means in the absence of forces applied to said plate and being displaceable from said reference position generally in the plane of the hull in response to the application of forces to said plate; and,

means responsive to displacement of said plate for generating a signal related to the displacement of said plate from said reference position, wherein said plate suspending means comprises:

first and second electromagnets carried by the hull of the vessel and having pole faces of one magnetic polarity facing outboard of the hull of the vessel; and,

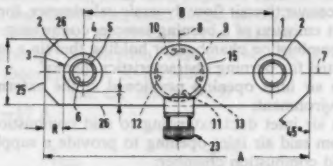
third and fourth electromagnets having pole faces of a polarity opposite said one polarity, said third and fourth electromagnets being secured to said plate with the pole faces thereof aligned with and in contact with the pole faces of said first and second electromagnets, said plate thereby being movably suspended by magnetic attraction between the pole faces of said electromagnets.

4,059,012

FORCE SENSING DEVICE

Ludwig Pietzsch, and Knud Overlach, both of Karlsruhe, Germany, assignors to Dr. -Ing. Ludwig Pietzsch, Ettlingen, Germany

Filed Sept. 21, 1976, Ser. No. 725,347
Claims priority, application Germany, Apr. 27, 1976, 2618359
Int. Cl.[2] B01L *1/22*
U.S. Cl. 73—141 A **11 Claims**



1. A force sensing device, which is to be inserted in a force transmitting structural member like a rope and is itself designed as a force transmitting member, the device comprising a flat body having between two connection openings at opposed ends of the body a central through hole of greater diameter than the connection openings, said through hole being closed at both ends and having fixed on its inner wall at least one strain measuring element, wherein

the flat body has a constant small thickness over its total length and a constant width at least in the body portion extending along the distance of the centers of the connection openings,

the diameter of the central through hole and thickness and width of the flat body are dimensioned such that the stress produced by nominal load at the weakest section of the body between the control hole and the longitudinal rim is lower than the proportional limit and amounts at most to ⅓ of the yield stress of the body material, and

spherical bearings are inserted in the connection openings, said bearings accomodating usual connection elements like shackles or the like for connecting the sensing device to the structural member.

4,059,013

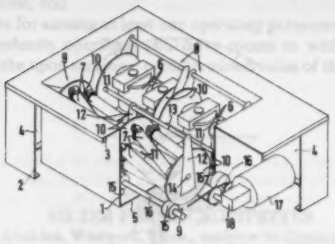
LABORATORY TEST DEVICE FOR TEXTILE SAMPLES

Roland Dietrich, Liestal, Switzerland, assignor to Ahiba AG, Switzerland

Filed Sept. 3, 1976, Ser. No. 720,477
Claims priority, application Switzerland, Sept. 5, 1975, 11512/75
Int. Cl.[2] B01F *8/10*; D06B *5/22*
U.S. Cl. 73—159 **2 Claims**

1. In a laboratory test device for textile samples in a testing liquid of the type for carrying out reproducible fastness tests and dyeing tests, having a tank for accommodating a heating liquid and a plurality of liquid impermeable test containers for holding the textile samples, said containers are detachably secured to at least one support member and are movably disposed in the heating liquid whereby the test containers are continuously tumbled within the heating liquid, wherein the improvement comprises the test containers being attached in

groups to the support member which includes two parallel, coaxial drive wheels of the same diameter positioned a certain distance apart and means for rigidly linking the two drive wheels to each other, driving means cooperating with said support member being located in the tank, said driving means



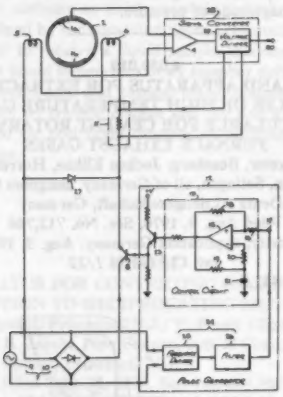
including at least one pair of horizontal, parallel shafts which are simultaneously driven to rotate at the same speed and which have a plurality of roll bodies disposed thereon, the peripheries of which rotate at the same speed, and the outer surfaces of said roll bodies being positioned on said at least one pair of shafts to engage the perpheries of said drive wheels.

4,059,014

ELECTROMAGNETIC FLOWMETER

Takashi Torimaru, Musashino, Japan, assignor to Hokushin Electric Works, Ltd., Tokyo, Japan

Filed Nov. 18, 1976, Ser. No. 742,831
Claims priority, application Japan, Nov. 28, 1975, 50-142605
Int. Cl.² G01F *1/60*
U.S. Cl. 73—194 EM **7 Claims**



1. In an electromagnetic flowmeter comprising:

A. a flow tube through which a fluid to be metered is conducted to intersect a magnetic field therein which is transverse to the direction of flow and is produced by an electromagnet having excitation coils;

B. a pair of electrodes mounted at diametrically-opposed positions in said tube, said electrodes each having a relatively large surface area whereby the electromotive force induced in the fluid intersecting the field and detected by the electrodes is averaged to minimize the effect of a non-uniform flow velocity on the accuracy of the meter; and

C. an excitation system for supply current to said coils, said system being constituted by:

a. a power source energized by a commercial a-c power line having a predetermined frequency and providing a direct voltage;

b. electronic switching means interposed between said direct voltage source and said coils;

c. control means to effect an on-off operation of said switching means at a pulse rate which is higher than the frequency of said a-c line; and

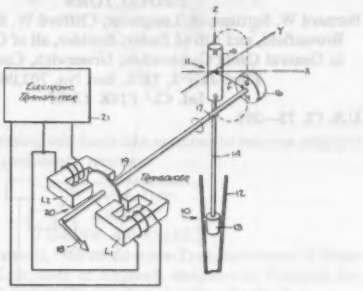
d. means gradually changing the duty cycle of said control means at a low-frequency rate which is less than said line frequency.

4,059,015

ANGLE-TO-CURRENT CONVERTER

Toshio Satori, Yokohama, Japan, assignor to Fischer & Porter Co., Warminster, Pa.

Filed Oct. 5, 1976, Ser. No. 729,822
Int. Cl.² G01F *1/24*; G08C *19/08*
U.S. Cl. 73—209 **6 Claims**



1. An angle-to-current converter for generating an electrical current in direct proportion to the degree of angular displacement of an input shaft, said converter comprising:

A. a differential-inductance transducer constituted by a pair of inductors, each having a core defining an air gap, and variable permeability disc means mounted on said input shaft and so cooperating with said air gaps as to increase the region of the disc means lying within one gap with a change in angle as the region lying within the other gap decreases, said disc means being constituted by an edge-contoured disc, said air gaps being diametrically-opposed with respect to the edge of said disc, whereby the inductance ratio of said inductance pair varies in accordance with said angular displacement; and

B. a transmitter coupled to said pair of inductors and responsive to said varying inductance ratio to generate a corresponding current.

4,059,016

FROTH LEVEL MONITOR

Frank Kitzinger, Montreal, and Frank Rosenblum, Ville St. Laurent, both of Canada, assignors to Noranda Mines Limited, Toronto, Canada

Filed Sept. 9, 1976, Ser. No. 721,770
Claims priority, application Canada, May 6, 1976, 251933
Int. Cl.² G01F *23/24*
U.S. Cl. 73—304 R **7 Claims**

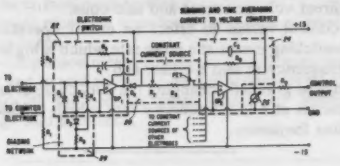
1. A froth level monitor comprising:

a. a plurality of electrically conductive electrodes spaced in the vertical direction and adapted to contact the top of the froth in sequence as the level of the froth rises;

b. a constant current source connected to each electrode and capable of generating a constant current when its associated electrode is in contact with the froth; and

c. a summing and time averaging current to voltage converter connected to the outputs of all said constant current sources for summing up the currents as an indication of

the total number of electrodes in contact with the froth and for averaging with respect to time the current variations so as to provide an indication of the mean level of the froth.

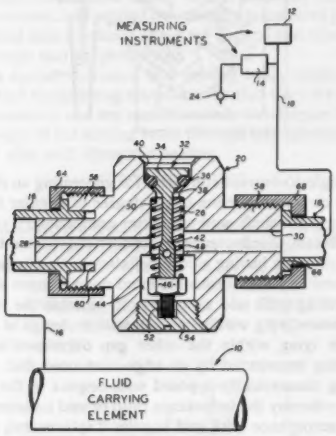


4,059,017

DETECTING APPARATUS WITH EXCESS PRESSURE PROTECTORS

Bernard W. Settlemyer, Longmont; Clifford W. Knappenberger, Broomfield, and Alfred Bader, Boulder, all of Colo., assignors to General Cable Corporation, Greenwich, Conn.

Filed July 2, 1976, Ser. No. 702,061
Int. Cl.² F16K *17/02*
U.S. Cl. 73—395 **13 Claims**



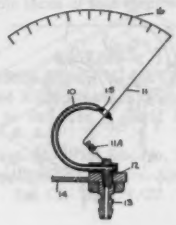
1. Apparatus for detecting characteristics of a fluid, including in combination, an element in which the fluid is contained under pressure, a detector for sensing a particular characteristic of the fluid, a passage leading from said element and another passage leading to said detector, means for protecting the detector from excess pressure in said element in which the fluid is contained, said means comprising a pressure relief valve including a housing enclosing a chamber, inlet and outlet ports of said chamber connecting with the passages leading from the element and to the detector, respectively, a third port for exhaust of fluid from the chamber, the pressure relief valve controlling flow of fluid from said third port, the inlet port being of substantially smaller diameter than the outlet port for throttling the flow of fluid into the chamber of the relief valve to limit the maximum rate of flow that can reach the relief valve so that said maximum rate of flow can be discharged from the apparatus by a relief valve of smaller size, less weight and lower cost, while the larger outlet port limits any flow throttling upstream of the relief valve, and the third port of the relief valve being of a cross-section sufficient to exhaust fluid from the chamber at a rate equal to the throttled flow through the inlet port.

4,059,018

DIRECT-ACTING LOW PRESSURE SENSOR

Franklin G. Reick, Westwood, N.J., assignor to Michael Ebert, Mamaroneck, N.Y., a part interest

Filed Nov. 5, 1976, Ser. No. 739,314
Int. Cl.² G01L *7/04*
U.S. Cl. 73—418 **10 Claims**



1. A fluid-pressure gauge adapted to measure pressure in a range below about 350 mm Hg, said gauge comprising:

A a fixed fluid input socket mounted on a frame element and coupled to a source of fluid whose pressure is to be metered;

B a flexible, non-dilatable bladder anchored at one end on said socket and communicating therewith, the other end of said bladder being sealed and being provided with an eyelet, said bladder being fabricated of non-metallic material and normally having a C-shaped formation; and

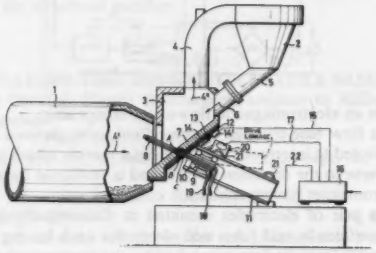
C a spring wire anchored at one end on said input socket and extending through said eyelet to form a pointer movable along a scale, the tip of said pointer being at a low end of said scale in the absence of applied fluid pressure, said bladder uncoiling in response to applied pressure to deflect said pointer along said scale to an extent depending on the magnitude of pressure.

4,059,019

METHOD AND APPARATUS FOR EXTRACTING GAS SAMPLES OF HIGH TEMPERATURE GASES, PARTICULARLY FOR CEMENT ROTARY KILN FURNACE EXHAUST GASES

Winfried Wurster, Bensberg; Jochen Kühne, Horrem, and Gerd Frodermann, Solingen, all of Germany, assignors to Klockner-Humboldt-Deutz Aktiengesellschaft, Germany

Filed Aug. 9, 1976, Ser. No. 712,746
Claims priority, application Germany, Aug. 9, 1975, 2535646
Int. Cl.² G01N *1/22*
U.S. Cl. 73—421.5 A **8 Claims**



1. Apparatus for obtaining gas samples from the exhaust gases of a rotary kiln furnace having an exhaust gas outlet, comprising:

gas sampling means including a gas sample pick-up device which comprises an elongate gas sampling probe;

guide means mounting said pick-up device for movement in

the longitudinal direction of said probe for disposition of said probe within and without of the exhaust gas outlet of the furnace;

drive means connected to said pick-up device for driving the same along said guide means;

remote control means connected to operate said drive means; and

means for sensing at least one operating parameter and independently operating said drive means to withdraw said probe upon sensing a predetermined value of that parameter.

4,059,020

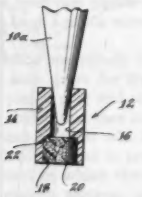
FILTER FOR MICROPIPETTES

Souren Avakian, Westport, Conn., assignor to Centaur Chemical Co., Stamford, Conn.

Filed Sept. 9, 1976, Ser. No. 721,874

Int. Cl.² B01L *3/02*

U.S. Cl. 73—425.4 P **5 Claims**



1. Filter apparatus for use with a liquid sampling pipette having a detachable tip member in the form of a truncated hollow cone defining an axial reservoir therethrough and an opening defined by the truncated tip and communicating with the reservoir to receive a liquid sample therethrough which comprises: a liquid impervious body member defining a liquid passage therethrough, said passage being dimensioned to frictionally solely by friction engage said tip; and a porous filter plug retained by said body member in alignment with said liquid passage.

4,059,021

APPARATUS FOR CONVERTING OSCILLATORY MOTION TO RECIPROCATING MOTION

Abram N. Spanel, Princeton, N.J.; P. Frank Elland, Stamford, and David R. Jacobs, New Canaan, both of Conn., assignors to Abram N. Spanel, Princeton, N.J.

Filed June 25, 1976, Ser. No. 699,905

Int. Cl.² F16H *27/02, 21/16;* D05C *15/00*

U.S. Cl. 74—89.2 **17 Claims**

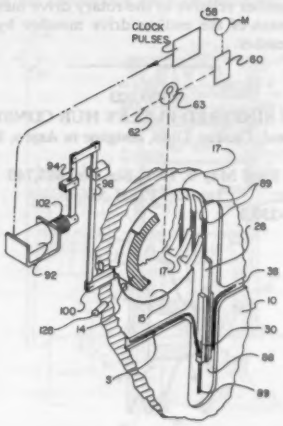
1. A means of converting oscillating motion to reciprocating motion, comprising:

an oscillatory member;

structure adjacent to said oscillatory member forming a peripheral track around at least a portion of said oscillatory member;

structure forming a track extending from said oscillatory member;

a band-like member selectively engageable with said oscillatory member and extendable within said extending track from said oscillatory member, said extending track preventing unwanted flexing of said band-like member within said extending track, a work end of said band-like member being away from said oscillatory member and reciprocable when said band-like member is engaged by said oscillatory member; and,



means for causing said band-like member to become engaged with said oscillatory member.

4,059,022

DRIVE ASSEMBLY

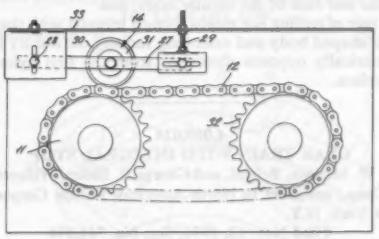
John Neville Fawcett, Newcastle-upon-Tyne, and Stuart William Nicol, Tow Law, both of England, assignors to National Research Development Corporation, London, England

Filed Nov. 29, 1976, Ser. No. 745,969

Claims priority, application United Kingdom, Nov. 27, 1975, 48829/75

Int. Cl.² F16H *7/00, 7/12, 7/10*

U.S. Cl. 74—226 **15 Claims**



1. A drive assembly comprising:

an elongated endless drive member;

a rotary drive member, said endless drive member being engaged on said rotary drive member for being driven by the rotary drive member and having a strand extending from said rotary drive member which in operation of the drive assembly is tensioned by the drive of the rotary drive member;

a guide member defining a guide surface; and

mounting means for mounting said guide member and for urging said guide member against the endless drive member on said tensioned strand of the endless drive member and on the side of said tensioned strand of the endless drive member which is opposite that engaged by the rotary drive member;

the guide surface of the guide member being positioned in contact with the endless drive member at the region of initial engagement of the endless drive member on the

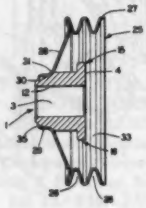
rotary drive member for guiding the endless drive member on to the rotary drive member, and for eliminating or inhibiting any radial component of velocity of the endless drive member relative to the rotary drive member during engagement of the endless drive member by the rotary drive member.

4,059,023

ONE-PIECE SINTERED PULLEY HUB CONSTRUCTION

Nolte V. Sproul, Canton, Ohio, assignor to Aspro, Inc., Canton, Ohio

Filed May 6, 1976, Ser. No. 683,740
Int. Cl.² F16H *55/36*
U.S. Cl. 74—230.3 **11 Claims**



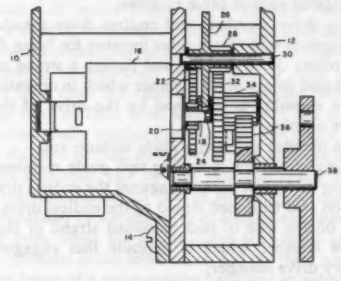
1. A one-piece pulley hub construction including:
a. a generally tubular-shaped body formed of sintered steel and having front and rear end faces, and a cylindrical bore extending axially between said end faces;
b. said body having first and second cylindrical outer surfaces extending axially between the front and rear end faces, with the first cylindrical surface having a greater axial length and diameter than the second cylindrical surface, and with said first cylindrical surface being adjacent the front end face;
c. a first conical surface, concavely-shaped in cross section, extending between and joining the first and second cylindrical surfaces;
d. a second conical surface extending rearwardly inwardly from the second cylindrical surface and joined with the rear end face of the tubular body; and
e. a pair of pulling lug means formed integral with the tubular-shaped body and extending radially outwardly in diametrically opposite directions from the first cylindrical surface.

4,059,024

GEAR TRAIN WITH INTEGRAL STOP

Elmer W. Madsen, Bristol, and George B. Soden, Wolcott, both of Conn., assignors to North American Philips Corporation, New York, N.Y.

Filed Nov. 12, 1976, Ser. No. 741,374
Int. Cl.² F16H *1/12, 55/04*
U.S. Cl. 74—421 R **7 Claims**



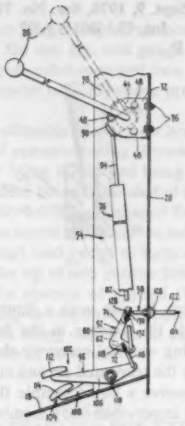
1. A gear train having an integral stop which comprises:
a plurality of gears in cooperating meshed relationship with cooperation with an associated means for driving, each of said gears in said plurality of gears being meshed with at least one of said other gears; at least first and second gears of said plurality of gears each having at least one surface extending in a direction generally the same as the direction of the axis of said gear, said surfaces interfering and preventing further movement of said train in one direction when said gear train is in one angular position.

4,059,025

SPEED CONTROL

Carl L. Waack, and Alador J. Giss, both of Livonia, Mich., assignors to Massey-Ferguson Inc., Detroit, Mich.

Filed June 21, 1976, Ser. No. 698,239
Int. Cl.² G05G *1/14, 11/00*
U.S. Cl. 74—482 **9 Claims**

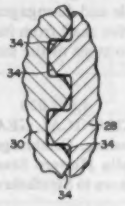


1. In combination with a vehicle having an engine speed regulator, an operator's station having a lower wall portion or platform, and an upwardly extending wall portion or bulkhead forward of the platform, the improvement comprising a position responsive acceleration and deceleration control means for the engine speed regulator, said control means including:
hand positionable means mounted entirely above the platform and behind said bulkhead, said hand positionable means including a hand lever moveable between first and second positions, and maintaining means for maintaining the hand lever in a given position;
motion transmitting means mounted below the hand positionable means and entirely above the platform and behind the bulkhead;
linkage means mounted entirely above the platform and behind the bulkhead and extending between the hand positionable means and the motion transmitting means and operable to move the motion transmitting means in response to movement of the hand positionable means;
foot control means mounted entirely above the platform and behind the bulkhead and interconnected with said motion transmitting means and operable against spring bias to cause movement of the motion transmitting means without affecting movement of the hand positionable means; and
moveable means interconnecting said motion transmitting means and said engine speed regulator, said moveable means including an intermediate portion passing through a wall portion.

4,059,026
TWO STAGE LIMITED SLIP DIFFERENTIAL

Gene A. Stritzel, Webster, N.Y., assignor to The Gleason Works, Rochester, N.Y.

Filed Nov. 4, 1974, Ser. No. 520,596
Int. Cl.[2] F16H 1/44
U.S. Cl. 74—711 12 Claims



1. In a differential unit for controlling relative rotation between first and second axle shafts through a known system of side gears operatively connected to said axle shafts and arranged to mesh with at least one pinion gear mounted to receive a driving moment from a prime mover, the improvement comprising

a face coupling assembly operatively connected with a selected one of said side gears for transmitting a driving moment from said pinion gear and said selected side gear to one of said axle shafts, said face coupling being assembled form two mating sections which can be moved axially relative to each other so as to provide (a) a first position of mating contact in which there is substantially no tendency for the mating sections of the face coupling assembly to move axially away from each other within a range of relative rotation of one of said axle shafts compared to the other of said axle shafts and (b) a second position of mating contact in which there is developed an axial thrust between said mating sections of said face coupling when the relative rate of rotation of one of said axle shafts compared to the other of the axle shafts exceeds said range,

control means for effecting relative axial shifting of mating sections of said face coupling assembly from said first position of mating contact to said second position of mating contact, and

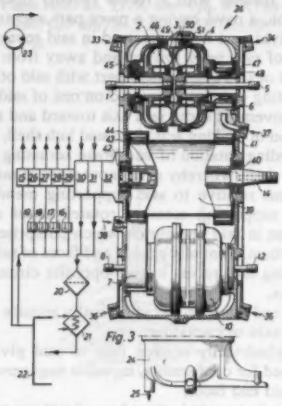
locking means engageable by said face coupling assembly when said mating sections of the assembly are moved axially to said second position of mating contact, said locking means being arranged to limit differential rates of rotation between said axle shafts.

4,059,027
MULTI-ENGINE ASSEMBLY

Bengt Olof Henrik Wallander, Stockholm, Sweden, assignor to Conort Engineering AB, Stockholm, Sweden

Continuation of Ser. No. 451,015, March 14, 1974. This application Apr. 14, 1976, Ser. No. 676,868
Claims priority, application Sweden, Mar. 14, 1973, 7303907
Int. Cl.[2] F16H 47/00
U.S. Cl. 74—718 9 Claims

1. In a multi-engine assembly of the type having a plurality of internal combustion engines each having a drive shaft, a common output shaft, and selective power transfer means for coupling said drive shaft to said output shaft; the improvement wherein said power transfer means comprises hydro-dynamic transmission means having a rotatable housing, a pair of separate output turbines fixedly mounted in said housing, a pair of input impellers rotatably mounted in said housing in alignment with said separate turbines for fluid coupling therebetween, means coupling each input impeller to the output shaft of a separate engine, a mechanical interconnection direct drive means coupled between said housing and said output shaft for continuously coupling said output turbines to said output shaft, a corresponding plurality of fluid pumps directly and continuously coupled to and driven by said output shaft, separate valve means for connecting each of said fluid pumps to an



associated power transfer means for selectively providing fluid coupling between corresponding impellers and turbines, and at least one starting motor for one of said internal combustion engines.

4,059,028
MULTIPLE SPEED HUB WITH COASTER BRAKE

Horst Schulz, Friedrichshafen; Josef Flösser, Schweinfurt am Main; Reinhard Kessler, Schwebheim; Karl-Heinz Schmidt, Schweinfurt am Main; Ewald Eisend, Grafenrheinfeld; Erich Hild, Schweinfurt am Main; Karl-Heinz Löffler, Hassfurt, and Werner Steuer, Oerlenbach, all of Germany, assignors to Fichtel & Sachs AG, Schweinfurt am Main, Germany

Filed Mar. 25, 1976, Ser. No. 670,521
Claims priority, application Germany, Apr. 2, 1975, 2514418
Int. Cl.[2] F16H 3/44
U.S. Cl. 74—781 B 10 Claims

1. In a multiple-speed hub for a bicycle and like vehicle including a shaft defining an axis of rotation; a tubular driver mounted on said shaft for rotation about said axis; a hub shell having two axially terminal portions mounted on said shaft and on said driver respectively for rotation about said axis; a multiple-shaped planetary transmission drivingly interposed in said hub shell between said driver and said hub shell, said transmission including a sun gear fixed on said shaft, a planet carrier member and an internally toothed ring gear member rotatable about said axis, a planet gear rotatably mounted on said planet carrier member in simultaneous meshing engagement with said sun gear and with said ring gear member, a coupling element secured to said driver for joint rotation, shifting means for shifting said coupling element between positions of driving engagement with said members respectively, and two clutches drivingly interposed between said hub shell and said members respectively, one of said clutches including: a driven portion

and a driving portion respectively secured to a first one of said members and to said hub shell for simultaneous rotation about said axis, said portions being radially offset, one of said portions being formed with a recess radially open toward the other portion, a pawl having a pivot part and an engagement part, said pivot part being received in said recess for pivoting movement of said pawl toward and away from a position of engagement of said engagement part with said other portion; a brake actuating element supported on one of said members for threaded movement about said axis toward and away from an axial position of braking action on said hub shell; and yieldable means impeding rotation of said brake actuating element relative to said shaft, whereby axial movement of said brake actuating element relative to said supporting member is caused when said supporting member rotates about said axis; the improvement in said one clutch which comprises:

a. two circumferentially spaced end faces of said one portion bounding said recess in two opposite circumferential directions,
   1. said end faces being cylindrically arcuate about respective axes of curvature,
   2. a cylindrically convex face of said pivot part being shaped for conforming, movable engagement with each of said end faces;
b. a convexly arcuate bottom face of said one portion bounding said recess in a radially inward direction,
   1. one of said axes of curvature being nearer said axis of rotation than the other axis of curvature, whereby said bottom face slopes from one of said end faces toward the other end face in a radially inward direction,
   2. the length of said bottom face being sufficient for permitting circumferential movement of said pawl in said recess between respective positions of engagement of said pivot part with said end faces.

4,059,029

TRANSMISSION FOR DRIVING A MOVABLE ELEMENT, PARTICULARLY A COMPONENT IN A MACHINE TOOL, AT HIGH SPEED OR CREEP SPEED

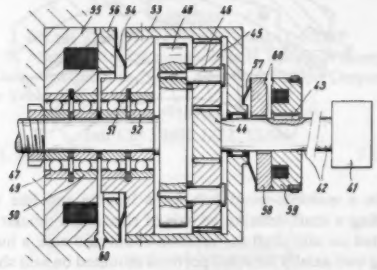
Ingo M. Cawi, Ritterstr. 15, 1 Berlin 45, Germany

Continuation of Ser. No. 485,078, July 2, 1974, abandoned. This application July 27, 1976, Ser. No. 709,238

Claims priority, application Germany, July 6, 1973, 2335132

Int. Cl.² F16H *57/10*; B23Q *17/00*

U.S. Cl. 74—785 **2 Claims**



1. A driving and positioning device for driving a movable element, particularly a component in a machine tool at high speed or creep speed through a specified cycle and for positioning it in required positions corresponding to the desired positions of a stepping motor forming part of the device said device comprising a stepping motor providing a single input, a drive shaft connected to said stepping motor, an epicylic drive connected to the drive shaft and comprising a driven shaft for driving the externally geared movable element, said epicylic drive having one branch for the transmission of high speed to the driven shaft and one branch for the transmission of creep speed to the driven shaft, the branch for the transmission of the high speed to the driven shaft comprising a clutch for connecting and disconnecting the drive shaft to an internally geared part of the epicylic drive and a brake to keep said internally geared part in a fixed position when it is disconnected from the drive shaft by the clutch during creep speed motions, the brake being disconnected from said internally geared part during high speed motions and upon completion of the high speed motion serving as an indexing means wherein the mating brake elements are engageable and disengageable thereby eliminating the deviation of the drive shaft from its desired position within the range between two steps of the stepping motor.

4,059,030

MECHANICAL GEARING

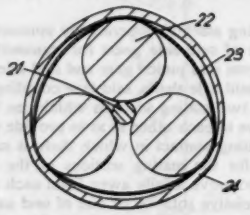
Alexander Bennett Gosling, Cambridge; Dexter Robert Plummer, Ongar, and Colin Howard Stanwell-Smith, Cambridge, all of England, assignors to Strathearn Audio Limited, Belfast, Northern Ireland

Filed Nov. 25, 1975, Ser. No. 635,071

Claims priority, application United Kingdom, Nov. 27, 1974, 51444/74

Int. Cl.² F16H *13/06*

U.S. Cl. 74—798 **3 Claims**



1. A gearing arrangement including a first rotatable member, a planetary element in contact with the first member, the said planetary element being caused to rotate by the rotation of the first member, a second relatively flexible rotatable member in contact with the planetary element and a third member which is rigid and fixed relative to the second member and against which the second member is urged by the planetary element, said second and third members being substantially hemispherical and hollow.

4,059,031

METHOD AND APPARATUS FOR THE PRODUCTION OF MACHINE TOOLS

Frank F. Erdelyi, 313 Foxhall St., Raleigh, N.C. 27609

Continuation of Ser. No. 455,632, March 28, 1974, abandoned. This application Feb. 17, 1976, Ser. No. 658,271

Int. Cl.² B21K *5/02*; B21D *19/00*; B21C *23/04*

U.S. Cl. 76—108 R **20 Claims**

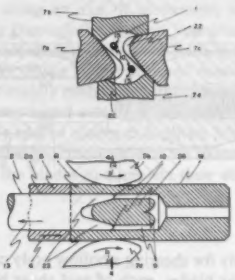
1. A method for chipless production of twist drills having inside, open cooling channels, comprising the steps of:

providing an elongate blank having at least one bore formed therein,

maintaining said bore free of filling metal while forging at least one spirally shaped flute in the outer surface of said blank by engaging said outer surface with forging tool means at a forging plane and producing relative longitudinal movement between said blank and said forging plane, and

simultaneously providing core matrix means within said at least one bore, said core matrix means having an outer core forming area, and positioning said core forming area at said forging plane during the forging of said at least one spirally shaped flute whereby at least one continuous elongate open channel is formed within said drill simultaneous with the formation of said at least one spirally shaped flute.

16. An apparatus for forming from an elongate blank having at least one longitudinal bore twist drills having a plurality of longitudinal cooling channels in the interior thereof and at least one spirally arranged flute on the outer surface thereof, said apparatus including forging means for engaging the outer surface of an elongate blank member and for forging said at least one flute therein, means for moving said blank axially relative to said forging means, and core matrix means extending axially into the at least one bore formed in said blank, said core matrix means including a plurality of projecting means having portions lying in the forging plane of said forging means, said projecting means being spaced apart from each other to provide a plurality of longitudinally extending cooling passages in said drill as said blank is moved relative to said forging plane, the outer surfaces of said core matrix portions conforming to the cross-sectional configuration of said passages.

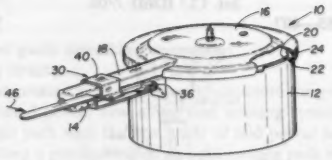


4,059,032

DEVICE FOR PRYING LOOSE A PRESSURE COOKER COVER

Charles B. Tornell, 46 Bradbury Road., New Castle, Del. 19720

Filed Sept. 17, 1976, Ser. No. 724,699
Int. Cl.² B25B *27/00*
U.S. Cl. 81—3 R **1 Claim**



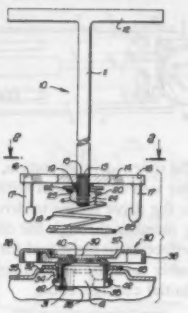
1. A convenience device for a pressure cooker of the type having a cylindrical cooking member and a circular cover for same, each with a laterally extending handle, said device being adapted to removingly release said cover from its sealed engagement with said cooking member and comprising an elongated body operatively arranged in a horizontal plane adjacent said cooking member handle, said elongated body having a gripping handle at its proximal end and a bearing member at its distal end in contact with said cooking member handle, and a positioning and pulling member adapted to be mounted on said cover handle with a depending leg thereof pivotally connected to said elongated body, whereby urging said elongated body through a pivotal traverse pries said cover from said cooking member by causing rotative movement of said cover relative to said cooking member, wherein said positioning member is in the specific form of a closed loop body adapted to accommodate the cover handle in projected relation therethrough.

4,059,033

OIL CAP REMOVER

Dennis G. Johnson, 6930 San Francisco St., Highland, Calif. 92346

Filed Apr. 23, 1976, Ser. No. 679,726
Int. Cl.² B67B *7/18*; B25B *13/48*
U.S. Cl. 81—3.1 B **2 Claims**



1. In a tool for removing screw oil cap from an automobile engine, said cap having a pair of diametrally opposed downwardly hollowed peripherally protruding ears, the combination of:

a rod having a handle at one end;

a crosshead fixed at its center to the opposite end of said rod;

a pair of "J" shaped hooks extending downwardly from opposite ends of said crosshead, said hooks trailing from their connections with said crosshead approximately in a counter clockwise relation with said rod and turning up sharply at their lower ends; and

spring means mounted on said tool between said hooks for compression between said cap and said tool when the tool is co-axially lowered compressively onto said cap with said hooks respectively closely facing said hollow ears, to thereby lower said hooks below the level of said ears, and facilitate counterclockwise rotation of said tool to bring said hooks under said ears, and when the pressure applied on said tool is relaxed, to upwardly spring bias said hooks with said tool to interlock said hooks with said ears, said tool thus capturing said cap, thereby permitting the cap to be unscrewed and removed and then screwed back in place by torque transmitted from said handle through said hooks to said ears optionally in clockwise or counterclockwise directions and without disturbing the captive relation between said hooks and said cap until the cap has been replaced and it is deliberately released from said hooks by depressing the tool to shift said hooks entirely below the lower level of said ears and then rotating the tool clockwise to shift said hooks out from under said ears.

4,059,034

SCREW-DRIVING DEVICES

Ewald Hornung, Rinteln, Germany, assignor to Feinwerkbau Helfer & Co. KG, Mollenbeck, Germany

Filed July 23, 1976, Ser. No. 707,959
Claims priority, application Germany, Sept. 15, 1975, 2541046
Int. Cl.² B25B *23/02*
U.S. Cl. 81—57.37 **9 Claims**

1. In a device for driving screws,

means defining a screw-holding magazine,

a casing,

a screw-driving member mounted for rotation in the casing,

drive means,

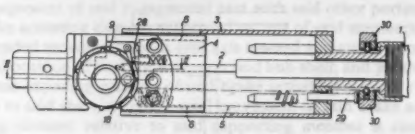
coupling means for coupling said drive means to the screw-driving member,

means for indexing successive screws from the magazine

into a screw-driving station in which each successive screw is aligned with the screw-driving member,

a slide member slidable in the casing and carrying the indexing means,

means operable by exertion of an applied force between the slide member and a workpiece about to receive a screw, to actuate the indexing means and thus index a screw in the



magazine to the screw-driving station, to bring the screw-driving member into engagement with the indexed screw and to actuate the drive means to drive the screw by the screw-driving member through the coupling means, and

resilient means effective to resist said force exerted between the slide member and the workpiece and to return the device to its initial configuration.

4,059,035

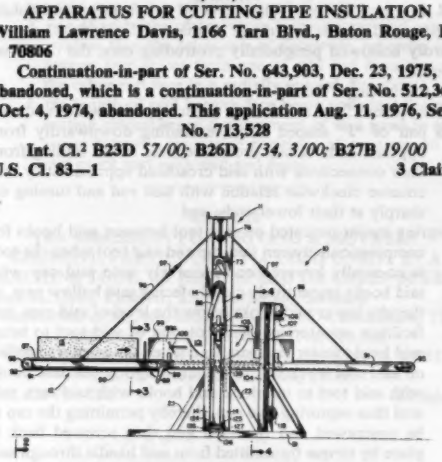
APPARATUS FOR CUTTING PIPE INSULATION

William Lawrence Davis, 1166 Tara Blvd., Baton Rouge, La. 70806

Continuation-in-part of Ser. No. 643,903, Dec. 23, 1975, abandoned, which is a continuation-in-part of Ser. No. 512,365, Oct. 4, 1974, abandoned. This application Aug. 11, 1976, Ser. No. 713,528

Int. Cl.[2] B23D *57/00*; B26D *1/34, 3/00*; B27B *19/00*

U.S. Cl. 83—1 **3 Claims**



1. An apparatus for cutting semi-circular segments of foamed glass or like insulation material from a block of foamed glass or like insulation material, said apparatus comprising a stationary vertically extending framework including pairs of spaced apart supports, a conveyor belt assembly having a conveyor belt traveling between said pairs of spaced apart supports for supporting a block thereon, a rigid reciprocating framework mounted for movement between said pairs of spaced apart supports, parallel saw carrying elements mounted above and on each side of said block for simultaneous, some directional movement with said reciprocating framework, two or more rigid, straight saw blades adjustably parallelly mounted between said saw carrying elements, wherein one of said saw carrying elements comprises pairs of parallel rods and a brace member adjacent one of said rods, said rods and said brace perpendicularly attached to end plates to form a slot between said rods and a second slot between said brace and said adjacent slot, and said saw blades each having one end mounted in a different slot then said other blade, and means for rotating said saw carrying elements to cut semi-circular segments from said stationary block of insulation material when said reciprocating framework is reciprocated.

4,059,036

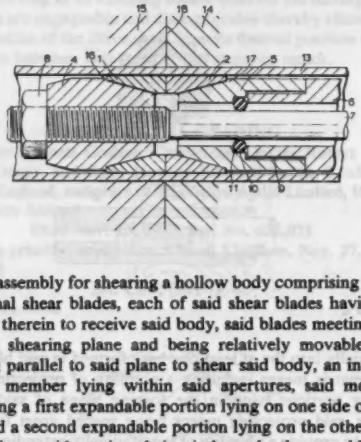
SHEARING HOLLOW STOCK

John Edward Hartley, Swavesey, England, assignor to T.I. (Group Services) Limited, Birmingham, England

Filed July 6, 1976, Ser. No. 702,463

Int. Cl.[2] B23D *21/00*

U.S. Cl. 83—188 **4 Claims**



1. An assembly for shearing a hollow body comprising a pair of external shear blades, each of said shear blades having an aperture therein to receive said body, said blades meeting in a common shearing plane and being relatively movable in a direction parallel to said plane to shear said body, an internal shearing member lying within said apertures, said member comprising a first expandable portion lying on one side of said plane and a second expandable portion lying on the other side of said plane, said portions being independently movable and each of said portions comprising a circumferentially extending surface having therein only a single gap, and means for expanding said portions simultaneously to substantially fill a hollow body placed in said apertures, said portions being relatively movable in a direction parallel to said plane on relative movement of said external shear blades.

4,059,037

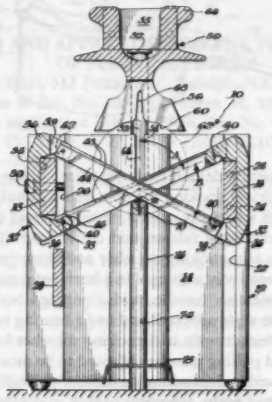
SLICING DEVICE

Samuel L. Gerson, and Frank W. Jones, both of Wilmington, Del., assignors to Fasline Food Equipment Co., Wilmington, Del.

Filed Apr. 26, 1976, Ser. No. 680,033

Int. Cl.[2] B26D *7/06*

U.S. Cl. 83—407 **14 Claims**



1. A slicing device comprising a pair of racks of substantially parallel sharp thin blades having a substantially uniform spacing for obtaining slices of predetermined thickness, the spacings in each rack being substantially twice the thickness of the

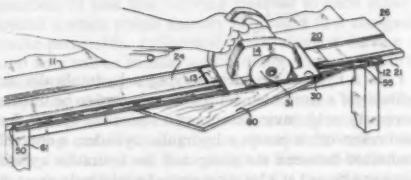
ultimate slices obtained from the slicer, a base frame, the pair of racks being mounted on the base frame in an intermeshed configuration in which the racks cross each other at junctions at intermediate portions, the intermeshed spacing of the blades in the racks being substantially uniform and substantially half the spacing in each individual rack of blades in the extremities of the racks away from the crossed junctions, a pusher, movable means mounting the pusher on the base frame to provide movement of the pusher towards and away from the crossed racks of blades along an axis of movement, and the axis of movement going through the crossed junctions of the blades whereby an object is first contacted with the more widely spaced extremities of the blades disposed outside of the cross junctions and ultimately pushed through the cross junctions of the blades whereby initial cutting is facilitated by the contact with more widely spaced blades to facilitate initial cutting and the object is gradually introduced into the narrower spacing at the junctions of the blades to complete their slicing.

4,059,038

ASSEMBLY AND METHOD FOR GUIDING A PORTABLE POWER SAW

Simon Petrus Rietema, 638 N. Crestview Drive, Glendora, Calif. 91740

Division of Ser. No. 571,140, April 24, 1975, abandoned. This application May 10, 1976, Ser. No. 684,697
Int. Cl.² B27B 9/04
U.S. Cl. 83—745 **13 Claims**



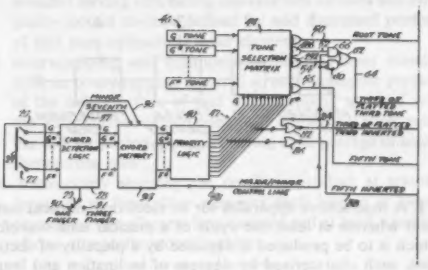
1. A saw guide assembly, comprising:
housing structure;
means associated with said housing structure for guiding an associated power saw along said housing structure in a straight path with the saw blade of said power saw moving along a predetermined straight cutting path alongside said housing structure;
a guidepiece having a longitudinal dimension for alignment along said straight cutting path, said guidepiece being made of a material cuttable by said power saw to define a reference edge;
said housing structure having a slot for slidably receiving said guidepiece, with said guidepiece extending transversely from said housing structure; and
means associated with said housing structure for holding said guidepiece in a fixed position on said housing structure with the longitudinal dimension of said guidepiece substantially aligned with said cutting path, said holding means being adjustable to selectively position said guidepiece across said cutting path whereby by making a cut along said cutting path with said power saw said guidepiece may be trimmed along its longitudinal dimension to define a reference edge aligned with said cutting path usable for positioning said saw guide assembly on a workpiece.

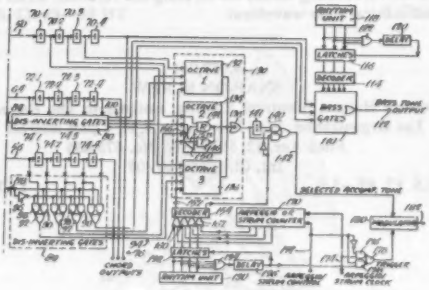
4,059,039

ELECTRICAL MUSICAL INSTRUMENT WITH CHORD GENERATION

Alden J. Carlson, Edmonds, Wash., assignor to Warwick Electronics Inc., Chicago, Ill.

Division of Ser. No. 482,064, July 24, 1976, Pat. No. 4,019,417. This application July 22, 1976, Ser. No. 707,815
Int. Cl.² G10H 1/00
U.S. Cl. 84—1.01 **7 Claims**





1. An electrical musical instrument comprising:
a plurality of tone generators for generating a plurality of tone signals, some of said tone signals being displaced by an octave from the frequency necessary to produce a noninverted chord;
chord selection means for developing chord signals each representative of a chord composed of a different plurality of tone signals;
a chord matrix for passing selected ones of the different plurality of tone signals from the tone generators in response to the chord signals from the chord selection means;
inverted chord detection means coupled to the chord selection means to determine that at least one of the tone signals passed by the chord matrix is displaced by said octave; and
a plurality of disinverting gates responsive to the inverted chord detection means for clamping the octave of the tone signal which is displaced by said octave.

4,059,040

TONE-SOURCE APPARATUS FOR ELECTRONIC MUSICAL INSTRUMENT

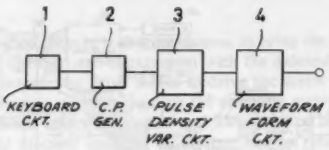
Nobuharu Obayashi; Hikaru Hashizume; Noriji Sakashita; Seiji Kameyama; Sadaaki Ezawa; Toshio Kugisawa; Yutaka Washiyama; Tatsunori Kondo, and Hironori Watanabe, all of Hamamatsu, Japan, assignors to Kabushiki Kaisha Kawai Gakki Seisakusho, Hamamatsu, Japan

Filed Sept. 10, 1975, Ser. No. 612,174

Claims priority, application Japan, Sept. 11, 1974, 49-104729; Sept. 12, 1974, 49-105861

Int. Cl.[2] G10H *1/06*; G10F *1/00*

U.S. Cl. 84—1.03 **7 Claims**



1. A tone-source apparatus for an electronic musical instrument wherein at least one cycle of a musical tone waveform which is to be produced is depicted by a plurality of sections lines, each charaterized by degrees of inclination and length, said apparatus comprising means to generate a series of pulses having regular intervals, pulse-density varying means for varying the pulse-density of the pulses in accordance with the degrees of inclination of respective of the section lines whereby a resultant series of pulses having a varied pulse density is formed, said pulse-density varying means including a memory circuit including a plurality of pulse-density setting portions for selecting pulse densities and a plurality of section range setting portions for selecting output time intervals, and waveform forming means for forming the resultant series into said musical tone waveform.

4,059,041

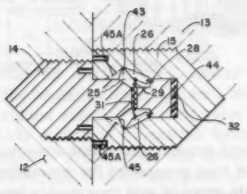
SNAP-ON SCREW

Edward Hassan, Montreal, Canada, assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Apr. 12, 1976, Ser. No. 675,856

Int. Cl.[2] F16B *21/08*

U.S. Cl. 85—3 S **1 Claim**



1. A pair of fasteners which may be joined together, with each of the pair of fasteners shaped to individually fasten to one of a pair of members that are to be joined together by the engaged pair of fasteners, in which said fasteners are each formed with an external screw thread, in which

a first unit of the pair of fasteners is formed with a cylindrical axial socket hole and a second unit of the pair of fasteners is formed with a cylindrical plug that extends axially from said second unit, said plug of a size to fit into the socket hole of the said first unit, in which

the socket hole of the first unit is formed with a concentric recess of a size to engage a pivoted leaf member fitted to the side of the plug, and in which the plug is fitted with a concentric recess of a size to retain a pivoted leaf member, said leaf member being pivotally mounted in said plug recess, said plug fitted with spring means to bias the leaf member to extend out of said plug recess and away from the axis of the plug,

said recess of the socket hole of the first unit shaped, in axial cross-section of the first unit, with a convex curved recess wall extending from the wall of the axial socket hole, as viewed from the center of rotation of the pivoted leaf member of the second unit, in the assembled state of the fasteners,

said convex curved recess wall located so as to bear against an end of the leaf member in the assembled state of the fasteners, so that an axial force applied between the two units, in the direction of separating the two units, biases the leaf member against the spring means and biases the leaf member away from the recess of the socket hole so as to permit disengagement of the two assembled units.

4,059,042

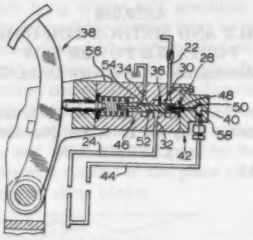
HYDRAULIC SYSTEM FOR EXTREMELY COLD ENVIRONMENTS

John W. Bridwell, Peoria, and George H. Meiner, III, Morton, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Oct. 4, 1976, Ser. No. 729,542

Int. Cl.[2] F15B *13/04, 11/08*

U.S. Cl. 91—469 **5 Claims**



1. In a hydraulic system serving a hydraulically actuated cylinder of a work element that is expected to be utilized in an extremely cold environment, said hydraulic system having a fluid reservoir, a pump, a hydraulic cylinder, a control valve connected between the pump and the hydraulic cylinder and being positioned at a location spaced a relatively great distance from said cylinder, a conduit connected to the pump for passing fluid from the reservoir to the pump, first means for passing fluid from the pump to the control valve, second means for passing fluid from the control valve to the hydraulic cylinder, and third means for returning hydraulic fluid from the control valve to the reservoir, said control valve having a chamber and first, second, and third ports in fluid communication with the chamber and each being connected to a respective one of the first, second, and third means, a spool slidably positioned within the housing chamber and being movable between a first position at which a fluid pathway is open from the pump, through the control valve and to the reservoir and a second position at which a fluid pathway is open from the pump, through the control valve and to the hydraulic cylinder and of a magnitude sufficient for actuating said cylinder by fluid passing through said pathway to the cylinder, the improvement comprising:

a fourth port opening into the control valve chamber;

a circulating conduit connected at one end to the fourth port and at the other end to the second means at a location immediately adjacent the hydraulic cylinder; and

fourth means for providing a fluid pathway from the pump, through the control valve, through the circulating conduit, through a portion of the second means, back through the control valve, and through the third means to the reservoir at the first position of the spool and, at the sec-

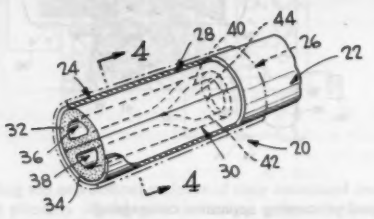
ond position of the spool, for blocking the fluid pathway from the pump to the circulating conduit and providing a fluid pathway from the pump, through the control valve and through the second means and to the hydraulic cylinder for the actuation thereof.

4,059,043

METHOD AND APPARATUS FOR MAKING TOBACCO SMOKE FILTERS

Richard M. Berger, Richmond, Va., assignor to American Filtrona Corporation, Richmond, Va.

Division of Ser. No. 644,144, Dec. 24, 1975, Pat. No. 3,994,306.
This application June 22, 1976, Ser. No. 698,684
Int. Cl.[2] A24C 5/50
U.S. Cl. 93—1 C 8 Claims



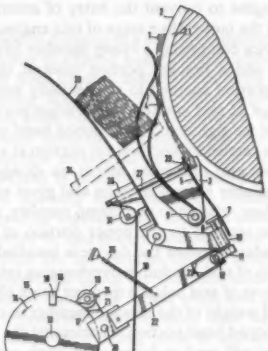
1. A method of making smoke filters comprising the steps of:
a. providing a first filtering material including a multiplicity of fibrous members;
b. defining a first elongated substantially cylindrical, annular bonding zone;
c. continuously passing said first filtering material through said first bonding zone and during passage of said first filtering material through said first bonding zone contacting same with a bond activating agent to bond said fibrous members of said first filtering material to each other at spaced contact points thereby forming a first elongated, smoke-permeable, cylindrical inner element having an axial bore and an annular wall defining a tortuous path for passage for smoke therethrough;
d. subjecting an arcuate section of the annular wall of said first cylindrical inner element to alternating axially spaced flattening and depressing actions to thereby reform said first cylindrical inner element into a first semi-cylindrical inner element having alternating axially spaced externally flattened portions and externally depressed portions, with said externally depressed portions forming axially spaced sections extending across the interior of said first semi-cylindrical inner element which offer at least as much resistance to passage of smoke as the material of said first semi-cylindrical inner element and which define together with said externally flattened portions a multiplicity of axially spaced, discrete, first cavities within said first semi-cylindrical inner element;
e. providing a second filtering material including a multiplicity of fibrous elements;
f. defining a second elongated substantially cylindrical, annular bonding zone;
g. continuously passing said second filtering material through said second bonding zone and during passage of said second filtering material through said second bonding zone contacting the same with a bond activating agent to bond said fibrous members of said second filtering material to each other at spaced contact points thereby forming a second elongated, smoke-permeable, cylindrical inner element having an axial bore and an annular wall defining a tortuous path for passage of smoke therethrough;
h. subjecting an arcuate section of the annular wall of said second cylindrical inner element to alternating axially spaced flattening and depressing actions to thereby reform said second cylindrical inner element into a second semi-cylindrical inner element having alternating axially spaced externally flattened portions and externally depressed portions, with said externally depressed portions forming axially spaced sections extending across the interior of said second semi-cylindrical inner element which offer at least as much resistance to passage of smoke as the material of said second semi-cylindrical inner element and which define together with said externally flattened portions a multiplicity of axially spaced, discrete, first cavities within said second semi-cylindrical inner element;
i. continuously juxtaposing said first and second semi-cylindrical inner elements to each other with said externally depressed portions of said semi-cylindrical inner elements facing each other to form a composite cylindrical inner member having alternating discrete first cavities and composite second cavities defined by said depressed portions of said semi-cylindrical inner elements;
j. overwrapping said composite cylindrical inner member with an overwrapping material so as to juxtapose portions of the inner surface of said overwrapping material with the outer surface of said composite cylindrical inner member to form sealed areas precluding axial passage of smoke thereacross; and
k. transversely severing the resulting product at selected locations to form filter elements each having at least a portion of two discrete first cavities and at least a portion of one composite second cavity.

4,059,044

APPARATUS FOR FORMING AND TAKING AWAY PACKETS OF BAGS

Günter Schliek, Hendschiken, AG, Switzerland, and Erwin Tirp, Lengerich, Germany, assignors to Windmoller & Holscher, Lengerich, Germany

Filed Mar. 26, 1976, Ser. No. 670,558
Claims priority, application Germany, Mar. 27, 1975, 2513776
Int. Cl.[2] F01B 19/00
U.S. Cl. 93—93 HT 5 Claims



1. Apparatus for forming and taking away packets of bags deposited by a rotary depositing cylinder of a bag-making machine, in which the bags are deposited on a stationary collecting table extending substantially radially to the depositing cylinder and the packets of bags are withdrawn and transported away in a direction opposite to the direction of rotation of the depositing cylinder by gripper units which pass through the plane of the collecting table and lift the packets of bags off the collecting table, wherein the improvement comprises long and short holding fingers each having one end positioned below the collecting table, said holding fingers extending through recesses of the collecting table from below and pro-

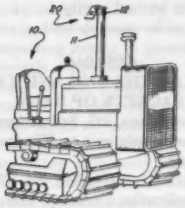
jecting beyond the collecting table, the other end of said long holding fingers projecting away from the depositing cylinder periphery, said holding fingers being flexible so they can move longitudinally of the collecting table, and can be flexed towards the depositing cylinder, mounting means for mounting said short holding fingers for reciprocating sliding motion substantially tangentially to the depositing cylinder between a retaining position where said short holding fingers retain bags on the depositing cylinder and a lowered position below the plane of the collecting table, control means for moving said short holding fingers substantially tangentially to the depositing cylinder to the retaining position after the lifting of an entire packet of bags by the gripper unit has commenced, and to the lowered position after collection of the first bags a new packet.

4,059,045

ENGINE EXHAUST RAIN CAP WITH EXTRUDED BEARING SUPPORT MEANS

Richard D. McClain, Schaumburg, Ill., assignor to Mercury Metal Products, Inc., Schaumburg, Ill.

Filed May 12, 1976, Ser. No. 685,513
Int. Cl.[2] F23L *17/02*
U.S. Cl. 98—122 **3 Claims**



1. In a gravity actuated protective cover device adapted to be secured upon the upstanding exhaust conduit of an internal combustion engine to prevent the entry of extraneous matter therein during the inoperative stage of said engine, said protective cover device comprising a clamp member having a looped band portion and a bracket portion integral therewith, the looped band portion adapted to substantially encircle the peripheral surface of said conduit, the bracket portion carrying means thereon for tightening said looped band portion, pivot support means carried by said bracket portion at a point spaced outwardly from said tightening means, an elongate relatively flat balance member journalled upon said pivot support means in a vertical plane relative to said clamp member, a dish-shaped cover member secured to the upper portion of said balance member and adapted when the device is installed to be seated over the mouth of said conduit in overhanging relation thereto, the point of pivot of said balance member being chosen relative to the size and weight of the balance member so that when the plane of the looped band portion is horizontal the weight of the cover member will tend to lower said cover member toward the looped band and raise the other end of the balance member, but normal pressure of exhaust gases from said internal combustion engine will tend to blow the cover off the conduit easily during operation of the engine with immediate dropping of the cover member when the engine stops, the invention herein which comprises:

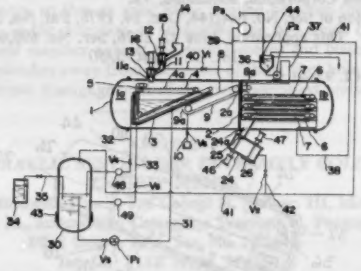
the bracket portion including a pair of spaced apart ears, the balance member being straddled by said ears, the pivot support means comprising a cylindrical bearing member mounted between the ears, the balance member having an integral, laterally protruding annular flange coaxial with a passageway therethrough a cylindrical bushing, said flange being permanently fixedly secured to said cylindrical bushing, the bushing being journalled and supported upon the bearing member and limited in axial movement thereon by the spaced apart ears.

4,059,046

APPARATUS FOR MANUFACTURING A SNACK FOOD WHOSE RAW MATERIAL IS FRUITAGE OR VEGETABLES

Tatsuo Yamazaki, Hikari; Takemi Hayashida, Hino, and Masatoshi Sakuma, Nagareyama, all of Japan, assignors to Kanro Co. Ltd., Tokyo, Japan

Filed July 2, 1976, Ser. No. 702,187
Int. Cl.[2] A47J *37/12*; F25D *25/04*; A23B *1/00*
U.S. Cl. 99—355 **3 Claims**



1. Food processing apparatus comprising:
a. a tank;
b. means for evacuating the interior of said tank;
c. a vessel in said interior adapted to hold oil;
d. means for heating the oil in said vessel to a frying temperature;
e. first air lock means for introducing the material to be fried into said interior;
f. first conveyor means movable in said interior for receiving the introduced material and for conveying the same through said oil, said conveyor means having a portion descending inward of said vessel and another portion rising outward of said vessel, whereby the conveyed material is fried in said oil;
g. second conveyor means movable in said interior subjacent said rising portion of the first conveyor means for receiving said fried material from said first conveyor means and for carrying the same out of said vessel;
h. a plurality of cooling panels spaced from said vessel, said panels extending horizontally in vertically spaced relationship, each panel having a top surface;
i. third conveyor means for receiving said fried material from said second conveyor means and for moving the same toward said panels;
j. fourth conveyor means associated with each of said panels for moving the fried material along the top surface of the associated panel, whereby said fried material is cooled, said fourth conveyor means including one conveyor associated with the topmost panel and another conveyor associated with the lowermost panel, said third conveyor means transferring the fried material to said one conveyor;
k. second air lock means for releasing the cooled material from said interior, said first and second air lock means limiting entry of atmospheric air into said interior, said other conveyor discharging the cooled material to said second air lock means.

4,059,047

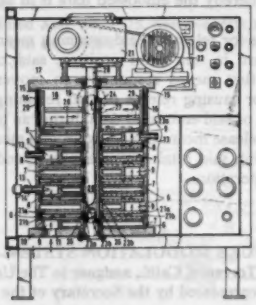
CONDITIONING MACHINE FOR CHOCOLATE MASSES

Helmut Sollich, Albernbere, Germany, assignor to Sollich KG, Germany

Filed July 20, 1976, Ser. No. 707,094
Claims priority, application Germany, Aug. 13, 1975, 2536063
Int. Cl.[2] A23C *3/04*; F25C *1/14*
U.S. Cl. 99—455 **4 Claims**

1. In a conditioning machine for chocolate masses, the machine comprising a stack of cooling stages forming a cylinder,

each having cooled top and bottom walls connected to a coolant recirculating system, a pump forcing the mass through all the stages, each stage containing scrapers revolving about the cylinder axis for continuously detaching the mass from the cooling surfaces, the improvement wherein each stage contains two rotating scraper devices which are urged axially apart by an interposed spring, and which are provided with scrapers



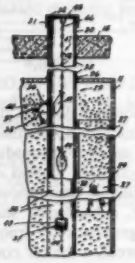
sweeping top and bottom surfaces of their associated one stage of said plurality of stages, said rotating scraper devices comprising arms radiating from a hub mounted on a drive shaft, each arm carrying or forming a scraper, wherein said hubs of the scraper devices are axially slidable on the drive shaft and wherein the respective spring of each stage is interposed between hubs of two scraper devices associated with the same stage.

4,059,048

MEANS OF FUMIGATING RAW AND FINISHED AGRICULTURAL PRODUCTS

Robert Daniel Dickson, 2110 S. Prairie, Stuttgart, Ark. 72160

Filed May 7, 1976, Ser. No. 684,084
Int. Cl.² A23L *3/34*
U.S. Cl. 99—482 **14 Claims**



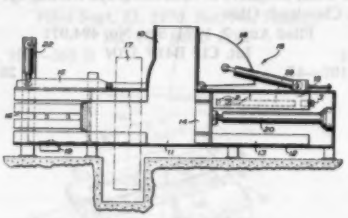
1. A fumigating apparatus comprising:
container means for confining a coherent aggregate mass of particulate agricultural materials,
an elongated member extending the depth of the container means and forming a passage-like gas chamber extending vertically through the interior of the coherent aggregate mass confined within the container means,
a closure sealing said elongated member at its bottom end;
said member having a top end extending out of said container means;
said top end having an upwardly directed opening formed therein for said gas chamber disposed at an accessible exterior location relative to said container means,
cap means for selectively closing said access opening and including support means within said chamber at said opening when the cap means are in closed position,
fumigant suspension means connected to said support means and gravitationally insertable into and suspendable within said gas chamber through said access opening whereby selected quantities of solid gas generating fumigant are suspended at different selected levels in said gas chamber,
said cap means have sealing means for closing and sealing said gas chamber at said access opening so that pressure build up will occur when said fumigant in said chamber changes to a gaseous form, and
spaced ports in said elongated member for directing the pressurized gas outwardly into the coherent mass to permeate and saturate the agricultural products,
said cap means being removable from the access opening, whereby said support means together with said fumigation means and any residual fumigant may then be removed from the gas chamber through said access opening.

4,059,049

METHOD AND A DEVICE FOR A BALE PRESS

Gunnar Kurt Arne Tillgren, Ystad, Sweden, assignor to Personer Verkstad, AB, Ystad, Sweden

Filed May 18, 1976, Ser. No. 687,482
Claims priority, application Sweden, May 28, 1975, 7506082
Int. Cl.² B30B *15/14*
U.S. Cl. 100—41 **6 Claims**



1. In a method in pressing in a bale press material which after compacting tends to expand due to stored inherent resiliency when relieved from stresses, said material being compacted in a channel during application of equally large but opposite pressing forces from on one hand a movable plunger means and on the other hand the rear surface of the bale last produced, said surface serving as an abutment, which last-produced bale is fixed in position by a tightening means until a predetermined pressing force has been obtained when the compacted material together with the bales ahead is displaced by a force exerted by said plunger means, which force exceeds the force exerted on the material by said abutment, the improvement comprising fixing the abutment once more by further action of said tightening means when said plunger means is located at a predetermined distance from its forward end position, the reexpansion taking place in said material during the pushing forward of the material being compensated for in the final movement of said plunger means towards its forward end position.

4,059,050

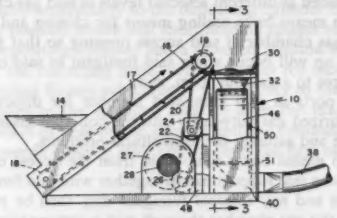
CAN CRUSHER

Charles McRea Davis, Jr., 5209 Nannette St., Bonita, Calif. 92002

Filed Mar. 26, 1976, Ser. No. 670,855
Int. Cl.² B30B *3/04, 9/32*
U.S. Cl. 100—91 **9 Claims**

1. A can crusher comprising:
a pair of wheels with one of said wheels having a resilient tire and the other wheel being non-resilient,
frame means for holding said wheels in abutting alignment with the outer circumferential surfaces touching,

said frame means including axles for supporting said wheels for relatively in line rotational movement,
motor means for rotating one of said wheels,
chute means for directing cans to be crushed into the intersecting contact of said wheels,



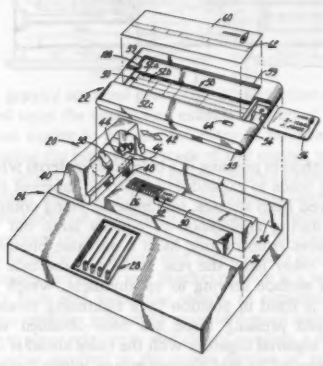
and said non-resilient wheel having outer projecting means on the outer surface thereof for being contacted by the outer circumferential surface of the resilient tire.

4,059,051

DATA RECORDER WITH PORTABLE CARTRIDGE

John A. Maul, Lyndhurst, and Richard E. Valentine, Mentor, both of Ohio, assignors to Addressograph Multigraph Corporation, Cleveland, Ohio

Filed Aug. 2, 1974, Ser. No. 494,071
Int. Cl.[2] B41F *3/04*
U.S. Cl. 101—45 26 Claims



2. A device for carrying an elongated record sheet having a plurality of transversely extending record areas, each adapted to receive printed information when brought into alignment with a print area, said device comprising:
a housing,
a take-up spool mounted for rotation in said housing to advance the record sheet,
means for fastening the record sheet to said take-up spool,
index stop means associated with said housing for preventing advance rotation of said take-up spool beyond a predetermined angular position whereby one of the record areas is brought into general alignment with the print area,
means for selectively releasing said index stop means to allow further rotation of said take-up spool beyond said predetermined angular position whereby another of the record areas may be brought into general alignment with the print area, said housing including a lid movable between an open position for loading the record sheet and a closed position, said release means being responsive to movement of said lid toward said closed position to release said index stop means.

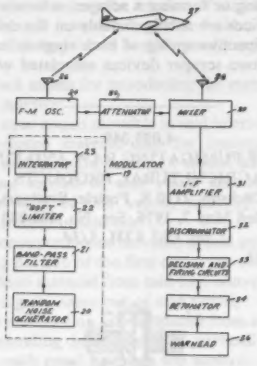
19. A transaction data recording apparatus for printing data along a print area, said apparatus comprising:
housing means,
imprint means including a carriage connected to said housing means and reciprocally movable in forward and reverse directions along a path from a home position and back to effect an imprint operation along the print area,
means for retaining a card bearing embossed data in a print position whereby the embossed data is in said print area, and
release means for releasing said retaining means from holding the card in said print position, said release means including first means responsive to movement of said carriage for causing release of said retaining means after imprinting of said embossed data during an imprint operation, said release means including second means for manually releasing said retaining means independently of said carriage operation.

4,059,052

FUZE MODULATION SYSTEM

Philip R. Karr, Torrance, Calif., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Feb. 21, 1957, Ser. No. 641,783
Int. Cl.[2] F42C *13/04*
U.S. Cl. 102—70.2 P 3 Claims



1. An improved noise-modulated distance-measuring fuze comprising in combination: an oscillator; a transmitting antenna coupled to said oscillator for radiating a signal towards a target; a modulator coupled to said oscillator to cause frequency modulation thereof, said modulator comprising a random noise generator, a band-pass shaper connected to the output of said noise generator for frequency shaping the random noise output thereof, a limiter coupled to said band-pass shaper for amplitude shaping the frequency-shaped noise output thereof, an integrator coupled to said limiter for integrating the frequency-shaped and amplitude-shaped output thereof, and means connecting the output of said integrator to said oscillator in such a manner as to frequency modulate said oscillator; a receiving antenna adapted to receive a portion of the signal radiated from said transmitting antenna after reflection from a target; mixer means for mixing the received signal from said receiving antenna with a local signal taken from said oscillator to produce a difference-frequency mixer output signal, said mixer output signal having a frequency spectrum peaked at a frequency greater than zero that decreases with decrease of fuze-to-target distance, the frequency at which the mixer output signal is peaked and the broadness of the spectrum in the vicinity thereof for a given fuze-to-target distance being dependent upon the characteristics of said band-pass shaper and said limiter; and means coupled to said mixer and

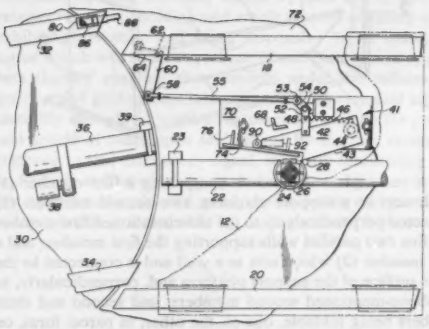
responsive to the frequency at which said mixer output signal is peaked for functioning the fuze at a predetermined fuze-to-target distance.

4,059,053

DRIVERLESS VEHICLE TRAFFIC CONTROL SYSTEM

Vercoe C. Jones, Easton, Pa., assignor to S I Handling Systems, Inc., Easton, Pa.

Filed Aug. 27, 1975, Ser. No. 608,132
Int. Cl.[2] B60S *13/00*; B61B *13/00*
U.S. Cl. 104—35 **15 Claims**



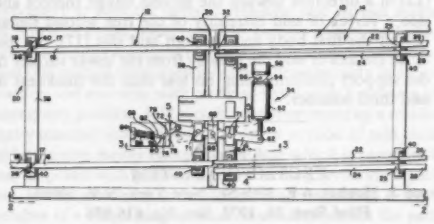
14. Apparatus for use in a driverless vehicle traffic control system comprising a table mounted for movement from a receiving position to a non-receiving position, a pair of tracks on said table for receiving a vehicle, a drive shaft on said table between said tracks, a motor means on said table for rotating said drive shaft about its longitudinal axis, and an actuator for initiating release of a vehicle stop means when said table is in its vehicle receiving position to receive a vehicle on said tracks, said actuator being supported by said table and projecting beyond the periphery of said table, a portion of said actuator being positioned for actuation by a portion of a vehicle passing said actuator portion to move said actuator from its release initiating position thereby to allow said stop means to return to its normally biased stopping position.

4,059,054

RAILROAD TYPE SWITCH

Mihai Alimanestianu, and Nicholas M. Alimanestianu, both of Upper Nyack, N.Y., assignors to Mihai Alimanestianu, Upper Nyack, N.Y.

Division of Ser. No. 438,021, Jan. 30, 1974, Pat. No. 3,918,665. This application Nov. 10, 1975, Ser. No. 630,329
Int. Cl.[2] B61J *3/00*; B61L *11/02*; E01B *7/00*
U.S. Cl. 104—88 **6 Claims**



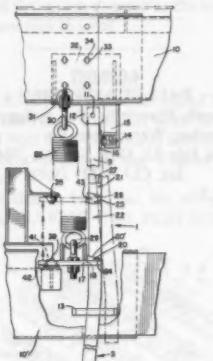
1. A tracked vehicle switch assembly operatively connected between a single main track and a pair of diverging tracks for directing a vehicle from said main track to one of said diverging tracks, said switch including, means on said vehicle for storing and displaying a destination representing one of said diverging tracks; means for detecting said destination on the vehicle as it approaches said switch assembly, at least one track section between said main track and said pair of diverging tracks; means for mounting said one track section for movement between two positions for selectively directing a vehicle on said main track to one of said diverging tracks; means responsive to said detecting means for moving said one track section into position corresponding to the detected destination, and means for locking said one track section in the position towards which it is moved while the vehicle is on said switch assembly; said detecting means including means for storing the detected destination of a vehicle while the rear wheels of a prior vehicle are still on said one track section to prevent operation of said moving means until said prior vehicle is off said at least one track section; and second means for moving said at least one track section independently of the first mentioned moving means and means on the vehicle for operating said second moving means to properly position said tracks before the front wheels of the vehicle pass from said track section.

4,059,055

RAILWAY CAR HINGE-DECK LOCK

Chandrakant D. Ravani, Farmington, and James C. Robertson, Ypsilanti, both of Mich., assignors to Portec, Inc., Oak Brook, Ill.

Filed Sept. 13, 1976, Ser. No. 722,821
Int. Cl.[2] B61D *3/02*
U.S. Cl. 105—368 R **10 Claims**



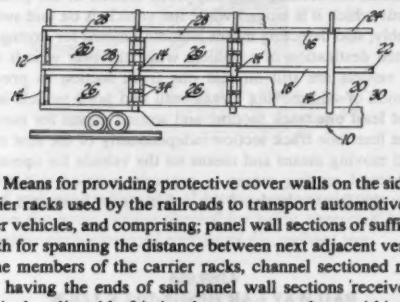
1. In a multi-level auto rack railway car having a hinge-deck section, the improvement comprising, a deck section lock mechanism including, a locking lever having an upper portion pivotally attached to said car and a lower portion depending to a point below said deck section, a catch plate on said deck section having an outer edge juxtaposed said lever, an upper and lower wedge bar on said lever spaced apart from one another to provide an opening therebetween, a wedge plate on said catch plate adjacent said outer edge, fixed upper and lower seat elements on said car disposed above and below said catch plate defining respectively upper and lower limits of displacement of said deck section whereby, when said deck section is lowered to engage said lower seat element said lever may be pivoted to position said lower wedge bar in overlying relationship with said wedge plate and when said deck section is raised to engage said upper seat element said lever may be pivoted to position said wedge plate within said opening between said upper and lower wedge bars.

4,059,056

RAILWAY SIDE PARCEL INSTALLATION

Angus L. Berryman, Dearborn Heights; Gene R. Hooper, Livonia, and Richard E. Hague, Franklin, all of Mich., assignors to Rax, Incorporated, Waterford, Mich.

Filed Jan. 26, 1976, Ser. No. 652,561
Int. Cl.[2] B60P *3/10*; B61D *3/02, 17/08*; B62D *25/02*
U.S. Cl. 105—368 R 10 Claims



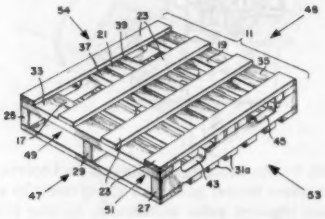
1. Means for providing protective cover walls on the sides of carrier racks used by the railroads to transport automotive and other vehicles, and comprising; panel wall sections of sufficient width for spanning the distance between next adjacent vertical frame members of the carrier racks, channel sectioned members having the ends of said panel wall sections received in relatively adjustable frictional engagement there within, and means for clamping and relatively securely fastening said channel sectioned members to the vertical frame members and for thereby in turn relatively retaining said panel wall sections relatively self and otherwise adjustably engaged thereto in general use.

4,059,057

PALLET ASSEMBLY

Joseph W. Carnwath, Pipersville, Pa., assignor to Pennsylvania Pacific Corporation, Warminster, Pa.

Filed July 12, 1976, Ser. No. 704,400
Int. Cl.[2] B65D *19/00*
U.S. Cl. 108—51.1 2 Claims



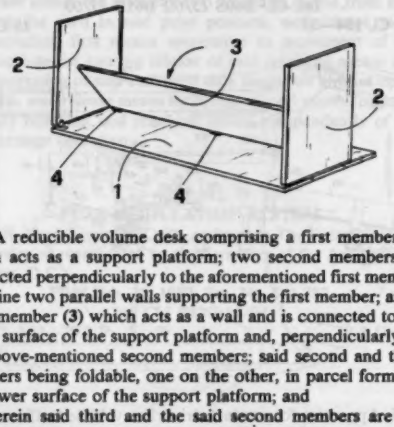
1. A pallet comprising
deckboards with runners depending therefrom,
positioning means on said pallet for positioning and locating an expendable skid on the pallet,
said positioning means comprising a pair of deckboards spaced apart to form a position-location groove adapted to receive an alignment runner of said expendable skid, and an expendable skid placed on said pallet,
said skid having a deckboard and runners depending therefrom,
said skid runners including an alignment runner depending from the skid deckboard,
said skid alignment runner being placed in said pallet position-location groove to properly position said skid on said pallet, whereby said groove confines the alignment runner on both sides from movement in either direction transverse to said groove.

4,059,058

REDUCIBLE VOLUME DESK

Takahama Kazuhide, Bologna, Italy, assignor to Simon International S.p.A., Bologna, Italy

Filed Aug. 23, 1976, Ser. No. 716,935
Claims priority, application Italy, Apr. 9, 1976, 3396/76
Int. Cl.[2] A47B *3/08*
U.S. Cl. 108—129 1 Claim



1. A reducible volume desk comprising a first member (1) which acts as a support platform; two second members (2) connected perpendicularly to the aforementioned first member to define two parallel walls supporting the first member; and a third member (3) which acts as a wall and is connected to the lower surface of the support platform and, perpendicularly, to the above-mentioned second members; said second and third members being foldable, one on the other, in parcel form, on the lower surface of the support platform; and

wherein said third and the said second members are connected by hinges to the lower surface of the support platform in such a way that said third member can be folded, in parcel form, on the lower surface of the support platform and that said second members can be folded onto the previously folded third member, the connection between said third and said second members being removable; and

wherein each said hinge connecting the second members to the support platform includes: a first body (11), virtually of "L" shape, a first flange (13) of which is fixed integrally to the lower surface of the support platform of the desk; and a second body (12), virtually of "L" shape, a first flange (14) of which is fixed integrally in a notch provided for this purpose in the upper border of one of said second members, said first flanges of said first and second body being arranged parallel to one another and second free flanges (15) and (16), respectively, being parallel and adjacent; said second body being provided, at a point corresponding to where the first flange (14) joins with the second free flange (16), with a slot (17) inside which is inserted, in a complementary fashion, an extremity of the free flange (15) of said first body; a hinge connection pin (18), the axis of which is parallel both to the plane of said first member and to that defined by said second member, passing through the first flange (14) of the second body (12) in a direction toward the second flange thereof and into a vertex of said extremity of the free second flange (15) of the first body and through said slot (17), the distance the axis of said pin is away from the lower surface of the support platform being no less than the thickness of said third member.

4,059,059

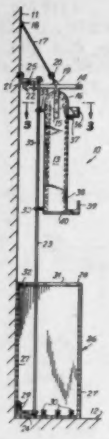
PROTECTIVE SYSTEM

Bernard J. Hughes, 6 E. 37th St., New York, N.Y. 10016

Filed Sept. 26, 1975, Ser. No. 616,956
Int. Cl.[2] E05G *1/00*
U.S. Cl. 109—1 R 1 Claim

1. An aesthetically pleasing system for use in protecting articles of value, such as originally framed paintings or the like, from an undesirable environment, comprising, in combination: a protective enclosure capable of isolating its contents from water, fire and heat, said enclosure having five substantially

sealed walls joined with one another and an upper cover hinged along one edge, said cover being movable between sealing and open positions, said enclosure further including cushioning spring means disposed at an inner base thereof, said enclosure also including an anchor bracket located within said five walls, an article support assembly secured by means of a fuse retainer at an exhibiting elevation above said protective enclosure, said article support assembly including a substantially flat plate member integral with a pair of depending strut members which carry the weight of an article of value supported therebetween, said plate member being of a predetermined size and shape conforming to the size and shape of an enclosure opening normally sealed by said cover, said fuse retainer releasably holding said article support assembly at said exhibiting elevation and being responsive to an emergency signal which will cause the release of said plate and strut members thereby enabling their descent under the influence of gravity, and guide means interconnected between said support assembly and said protective enclosure for guiding the path of said article of value upon said release by the fuse retainer in response to said emergency signal, said path terminating with said article and article support assembly coming to cushioned rest against said cushioned spring means within said protective enclosure that is sealed shut by sealing contact between said



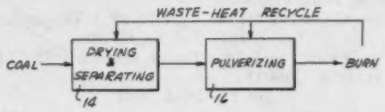
flat plate member and enclosure surfaces defining said enclosure opening, said article support assembly further including movable curtain means resistant to said undesirable environment for protecting an article of value, means for guiding the path of said movable curtain means, weight means for influencing the movement of said curtain means, stop means for limiting the movement of said curtain means, and retaining means responsive to heat for initially retaining said curtain means in an initial position, said movable curtain means including a pulley assembly supported by said article support assembly, at least one curtain supported by said pulley assembly in an initial position and movable with portions within track recesses to an emergency position, said weight means comprising a relatively heavy member integral with a forward portion of said curtain, said retaining means comprising a fuse which is responsive to heat disposed with portions thereof in the gravitational path of said heavy member, said stop means comprising a bracket member of a shape adapted to receive and obstruct the path of said heavy member, whereupon at a predetermined environmental temperature said fuse and said fuse retainer will respond, thereby causing both the curtain to fall under the influence of said heavy member into an emergency position covering the article of value and the entire article support assembly and covered article to descend into the protective enclosure.

4,059,060

METHOD AND APPARATUS FOR COAL TREATMENT

Gerard C. Gambs, New York, N.Y., and Horace P. Morgan, Plainfield, N.J., assignors to Ford, Bacon & Davis, Incorporated, New York, N.Y.

Filed Mar. 29, 1976, Ser. No. 671,111
Int. Cl.[2] F23K *1/04*
U.S. Cl. 110—1 J **12 Claims**



1. The method of upgrading subbituminous coal and/or lignite fuel product non-complying with an applicable SO_x:Btu standard during the combustion thereof, comprising drying said fuel product at the combustion site to lower the total moisture content thereof from between about 15 and 45 percent to between about 4 and 7 percent to concomitantly raise the heating value of said fuel product sufficiently so that said SO_x:Btu standard will be met during the combustion of said fuel product, and thereafter burning said fuel product while it is in the latter total moisture content range.

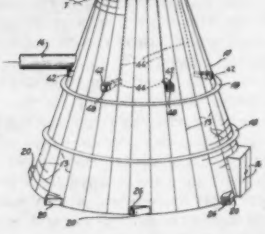
6. Apparatus for upgrading solid particle subbituminous coal and/or lignite fuel product non-complying with an applicable SO_x:Btu standard during the combustion thereof, comprising means for drying said fuel product at the combustion site, and including separating means for removing heavier weight ash particles from said fuel product prior to the burning thereof to lower the sulfur content thereof.

4,059,061

WASTE BURNER OVERFIRE DRAFT SYSTEM

George Kahlert; Lawrence Pommer, both of Prince George; John Davis, and Bert Whebell, both of Houston, all of Canada, assignors to Northwood Pulp and Timber Limited, Prince George, Canada

Filed Dec. 3, 1975, Ser. No. 637,401
Int. Cl.[2] F23G *7/00*; F23H *9/00*
U.S. Cl. 110—7 A **21 Claims**



1. For use with a waste burner which burns wastes at a base in the interior thereof, an overfire draft system comprising:

a. air vents arranged circumferentially around the base of the burner for communicating the interior of said burner to the atmosphere; and

b. a draft modulated damper plate located in each air vent for automatically regulating the volume of overfire air delivered to the interior of the burner, said draft modulated damper plate being provided with a lower lip which is deflected by a predetermined angle with respect to the plate to create an aerodynamic lift effect with a large opening moment to assist the damper plate in its response under low air velocity conditions, and an oppositely deflected upper lip with proportionately less bent surface to

avoid hunting of the damper plate as it approaches the maximum open position and to provide added dynamic opening force.

4,059,062

SEWING MACHINE HAVING A DUAL-PURPOSE COMPLEMENTARY CASE

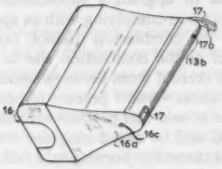
Georges Drevet, 24 Rue Francisque Vovtier, 42100 Saint-Etienne, Loire, France

Division of Ser. No. 368,686, June 11, 1973. This application Dec. 2, 1975, Ser. No. 636,952

Claims priority, application France, June 12, 1972, 72.21520; Mar. 14, 1973, 73.09815

Int. Cl.[2] D05B *75/00*

U.S. Cl. 112—258 **11 Claims**



1. The combination of a sewing machine and a dual-purpose complementary case, said machine comprising components including a pedestal, a cantilever arm projecting horizontally from said pedestal, a vertical body extending upwardly from said pedestal, an upper arm extending horizontally from said vertical body at a level above said pedestal, and a head on said upper arm disposed above said cantilever arm, said components having generally curvedly and largely rounded portions, said pedestal having a transverse cross-sectional shape which is symmetrical in thickness relative to a horizontal median plane therethrough, said cantilever arm extending from said pedestal in the lengthwise direction thereof and being of reduced width relative to said pedestal, said cantilever arm and head being symmetrically located with respect to a common vertical plane, said cantilever arm having an upper planar surface forming a substantially coplanar extension with the upper surface of said pedestal, said case comprising a base defining an enclosure having an open mouth, said base being shaped in correspondence with said pedestal to fittingly receive the same and said cantilever arm therein, a plurality of flap means hingedly connected to said base at said open mouth for undergoing inward pivotal movement to engage said upper arm and head and substantially enclose the same and said vertical body to form a protective closure therefor for transport of said machine, said case being removable from said machine and said flap means being foldable to a position within said enclosure, said case having aperture means for penetration of said cantilever arm therein with the case inverted from the position in which said case fittingly receives said pedestal, said base in said inverted position forming an extension of said upper surface of said cantilever arm and of said pedestal to provide a large work surface.

4,059,063

ROLL-FURLING MAINSAIL

Frederick E. Hood; Donald K. Mitchell, and Gary S. Uhring, all of Marblehead, Mass., assignors to Hood Sailmakers, Inc., Marblehead, Mass.

Filed Aug. 30, 1976, Ser. No. 718,870

Int. Cl.[2] B63H *9/10*

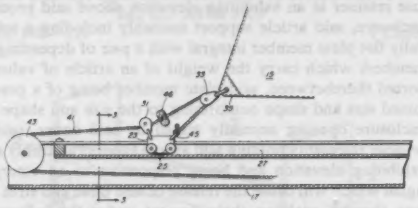
U.S. Cl. 114—106 **6 Claims**

1. In a sailboat having a mainsail which is roll-furling at the luff edge thereof, outhaul apparatus for securing the clew of the mainsail to a boom at varying stages of partial furling, said apparatus comprising:

a car which is freely slidable along the boom in dynamic response to forces exerted on said car;

a block carried by said car;

a block at the clew of said mainsail; an outhaul line rigged to pull aft from the tip of the boom, said line passing from the



tip of the boom forward through the block on said car, thence through the block on the sail and then back to the car where it is secured to the car, whereby the balance of forces exerted on said car by said line bias said car to a position along said boom providing an advantageous drawing angle for shaping said mainsail.

4,059,064

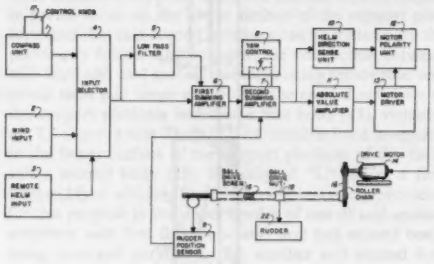
MARINE AUTO PILOT

Baron Christian Dickey, Palo Alto, Calif., assignor to Alpha Marine Systems, Inc., Sunnyvale, Calif.

Filed Apr. 5, 1976, Ser. No. 673,798

Int. Cl.[2] B63H *25/02*

U.S. Cl. 114—144 E **10 Claims**



1. Apparatus for producing a voltage correlated in magnitude and polarity to the relative rotative position between a first member and a second member rotatable relative to said first member on a rotational axis, comprising:

a. A Hall-effect element fixed to said first member and positioned on said rotational axis.

b. First and second permanent magnets producing individual magnetic fields and fixed to said second member symmetrical to said rotational axis, said magnets each having north and south poles, the north pole of said first magnet and the south pole of said second magnet being diametrically spaced apart and of large diameter relative to the space between them, to form a high intensity, additive and homogeneous magnetic field there between for the purpose of driving said Hall-effect element and being disposed so that said Hall-effect device is located substantially centrally within said high intensity additive and homogeneous magnetic field, senses and high intensity, additive and homogeneous magnetic field and is substantially non-responsive to the earth's magnetic field, the south pole of said first magnet and the north pole of said second magnet being sufficiently remote from said additive and homogeneous magnetic field to avoid substantial influence upon said Hall-effect element.

10. In an auto pilot for a marine vessel sailing in the presence

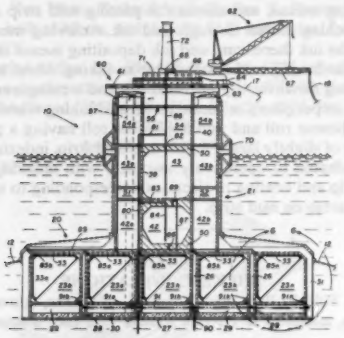
of perturbing frequencies, and producing a signal having a magnitude and polarity correlated to the deviation of the actual heading from the desired headings, a method for processing said signal to minimize the effect of perturbing frequencies comprising the steps of;

a. attenuating relatively high frequency portions of said signal to produce an attenuated signal;
b. summing the signal and the attenuated signal;
c. determining the absolute value of said summed signal;
d. determining the polarity of said summed signal;
e. steering the vessel in a direction dictated by the polarity and at a rate dictated by the absolute value of said signal.

4,059,065
SEMISUBMERSIBLE LOADING MOORING AND STORAGE FACILITY

Robert L. Clark, Greenlawn, N.Y., and Paul C. Dahan, Pittstown, N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Feb. 7, 1977, Ser. No. 766,163
Int. Cl.² B65D *89/10*
U.S. Cl. 114—256 **13 Claims**

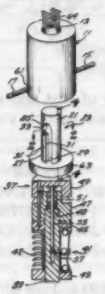


1. A semisubmersible storage facility comprising:
a submerged storage section comprising:
a plurality of dual crude/water tanks;
a flexible diaphragm installed internally in each of said plurality of dual crude/water tanks, said diaphragm being postioned to continuously separate crude from water as the fluids in each dual crude/water tank charges from substantially one hundred per cent crude to substantially one hundred per cent water or from one hundred per cent water to one hundred per cent crude; and
means for spacing and connecting said dual crude/water tanks together to form said submerged storage section having void spaces defined between adjacent dual crude/water tanks, said void spaces adapted to be flooded with water;
a central tower section affixed at its lower end to said submerged storage section and extending to a point substantially above the waterline when said facility is in an operable position;
a plurality of crude only tanks positioned in said central tower section;
means adapted to be connected to a crude supply source for filling said crude only tanks with crude;
means for fluidly connecting said crude only tanks to the upper side of said diaphragm in each of said dual crude/water tanks in said submerged storage section for moving crude to or from each of said dual crude/water tanks whereby said dual crude/water tanks can be filled with or emptied of crude from said crude only tanks; and
means adapted to be connected to a water supply source for supplying or draining water to or from the lower side of said diaphragm in each of said dual crude/water tanks.

4,059,066
MECHANICAL MOTION SENSOR

Reinhold Grassl, 142 S. Miraleste Drive, Apt. No. 203, Miraleste, Calif. 90732

Filed May 28, 1976, Ser. No. 690,950
Int. Cl.² G01P *13/00*
U.S. Cl. 116—115 **10 Claims**



1. A motion sensor comprising:
a housing formed with an elongated float chamber and including stop means projecting into said chamber and formed with a stop face facing longitudinally in one direction;
an elongated float telescoped into said chamber, said float being sized for free rotation about its longitudinal axis and longitudinal travel in said chamber and having a first position at one end of its longitudinal travel, a second position at the opposite end thereof and an intermediate sensing position;
abutment means on said float and including an abutment surface facing said stop when said float is in its first position for engaging said stop;
passage means in said float extending longitudinally past one side of said abutment means; and
alignment means normally aligning said abutment surface longitudinally with said stop face when said float is in its first position whereby rotational and longitudinal travel of said float in said chamber from said first position to proximate said sensing position will cause said surface to clear said stop face thus causing said stop means to be received in said passage means for further longitudinal travel of said float relative to said housing thus indicating such rotation has occurred.

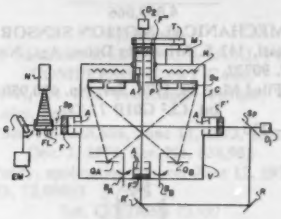
4,059,067
APPARATUS FOR DETERMINING THE RATE OF FLOW OF PARTICLES IN A VACUUM DEPOSITION DEVICE

Marcel Lardon, Maienfeld, Switzerland, and Hans Pulker, Triesen, Liechtenstein, assignors to Balzers Patent-Und Beteiligungs-Aktiengesellschaft, Liechtenstein

Division of Ser. No. 619,528, Oct. 3, 1975. This application June 15, 1976, Ser. No. 696,410
Claims priority, application Switzerland, Oct. 9, 1974, 13668/74
Int. Cl.² C23C *13/00*; G01N *21/22*
U.S. Cl. 118—7 **2 Claims**

1. A vacuum deposition device comprising a housing having a vacuum chamber, means for holding a substrate to be coated in said vacuum chamber, means for holding the coating material and for establishing a current of particles from the material across the chamber to the substrate holding means, means for directing a first laser beam through the particle current, further

means for directing a second laser beam through the particle current at an angle from the first laser beam and receivers for



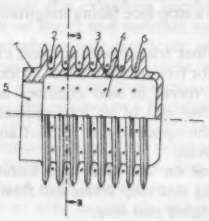
measuring the intensity of first and second laser beams after their passage through said particle current.

4,059,068

APPARATUS FOR TREATING FILAMENTARY PRODUCTS

René Guillermin, Bron; Jean Joly, Craponne, and Sylvio Sangalli, Caluire, all of France, assignors to Rhone-Poulenc-Textile, Paris, France

Division of Ser. No. 583,914, June 5, 1975, Pat. No. 4,020,196. This application Sept. 30, 1976, Ser. No. 728,381
Claims priority, application France, June 10, 1974, 74.20253
Int. Cl.[2] B05C *3/15*
U.S. Cl. 118—420 **4 Claims**



1. Apparatus for treating and advancing a textile yarn with minimal friction comprising

a static cylindrical body having

an internal chamber, and

an external surface, said external surface having

at least one groove therein, said groove having a depth at least equal to the diameter of the yarn to be treated,

suspension means for suspending a yarn in a treating fluid in said groove and for advancing the yarn along said grooves, said suspension means including

pressurized fluid supply means communicating with said internal chamber, and

a channel in communication with said orifice and said chamber, said channel being substantially parallel to a tangent to said cylinder to deliver pressurized fluid from said chamber through said orifice at an angle having a component in the direction of advancement of said yarn.

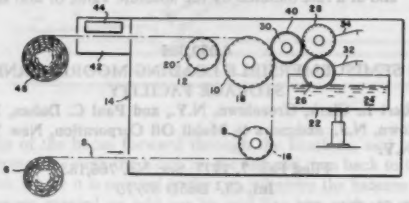
4,059,069

COATING APPARATUS

Donald T. Ford, Mountain View, Calif., assignor to The Arnold Engineering Company, Marengo, Ill.

Filed Aug. 30, 1976, Ser. No. 718,738
Int. Cl.[2] B05C *1/00*
U.S. Cl. 118—642 **1 Claim**

1. Apparatus for depositing a coating material on preselected areas of an elongated strip which in a continuous system comprises coating material depositing means, means for passing said strip through said coating material depositing means to deposit coating material on the surface of one side of said strip, ink depositing means, means for passing said strip with said coating thereon through said ink depositing means to deposit ink only on said preselected areas, ink curing means, means for passing said strip with ink deposited thereon through said ink curing means to cure said deposited ink, strip etching means, means for passing said strip with said cured ink thereon through said strip etching means to remove coating material from that portion of the strip not covered by said cured ink, ink



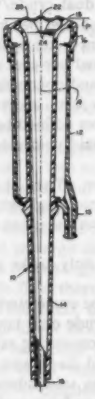
removing means, and means for passing said strip from said strip etching means through said ink removing means to remove the ink therefrom, said ink depositing means including a reservoir having said ink therein, an inking wheel above and extending downwardly into said ink and a rotagravure wheel having its periphery in contact with said inking wheel and with an applicator roll and said applicator roll having a peripheral groove of slightly larger width than said strip, indexing projections adapted to operatively associate with indexing holes in said strip and coating projections corresponding to said preselected areas on said strip.

4,059,070

MILKING INFLATIONS

Don F. Siddall, Bath, and Vincent L. Hoffman, Akron, both of Ohio, assignors to Hi-Life Rubber Co., Inc., Johnson Creek, Wis.

Continuation-in-part of Ser. No. 9,197, Feb. 6, 1970, Pat. No. 3,661,120. This application Nov. 29, 1971, Ser. No. 202,853
The portion of the term of this patent subsequent to May 9, 1989, has been disclaimed.
Int. Cl.[2] A01J *5/04*
U.S. Cl. 119—14.47 **3 Claims**



1. A milking inflation comprising an elongated, tubular body portion, a generally cylindrical cuff portion merged with one end of said body portion and a teat-receiving collar extending inwardly from generally the point of merger of said body and cuff portions, and extending conically upwardly beyond the

end of said body portion when said cuff portion is folded down over the former, the inner periphery of said collar (a) being of generally uniform thickness, (b) having a generally circular configuration about its perimeter and (c) being formed of a series of contiguous wave forms free of sharp corners representing periodic oscillations above and below a plane passed through the center of said inner periphery perpendicularly to the major axis of said body portion, so that a portion of the true length of said inner periphery lies above said plane and a portion lies below said plane, said true length of said inner periphery along said wave forms exceeding the finite length of said periphery projected onto said plane, the portion of said true length of said inner periphery lying above said plane being unequal to the portion lying below said plane.

4,059,071

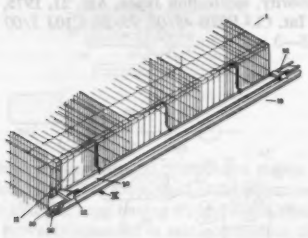
POULTRY CAGE SYSTEM WITH CONTROLLED FEEDER

Robert L. Van Huis, Zeeland, and Charles T. Carten, Grand Rapids, both of Mich., assignors to U.S. Industries, Inc., New York, N.Y.

Continuation of Ser. No. 590,695, June 26, 1975, abandoned, which is a continuation-in-part of Ser. No. 477,698, June 26, 1974, abandoned. This application July 26, 1976, Ser. No. 708,359

Int. Cl.² A01K *39/00*

U.S. Cl. 119—18 **8 Claims**



1. A poultry cage system having controlled feeding apparatus including:

a series of cages having at least portions thereof constructed of material constructed to permit poultry within said cage to reach and feed therethrough;

a feeding trough mounted on and along said cages adjacent said portions;

a feed carrier in said trough and having drive means therefor;

a movable cover means movable to a closed position to prevent access by poultry within said cage to feed within said trough and movable to an open position to permit poultry to feed from said trough through said portions;

a cable means for actuating said cover means causing said cover means to move from closed to open position;

said cable means running in a direction along said series of cages;

guide means mounted on said portions of said cages at spaced intervals along said series of cages for directing and guiding portions of cable means to said cover; and

actuating means for pulling said cable means in a direction along said series of cages and for releasing the same to effect closing and opening of said cover means; and control means for causing timed operation of said drive means for said feed carrier and of said actuating means for said cable means.

4,059,072

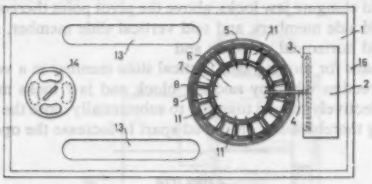
AUTOMATIC AQUARIUM LIGHTING AND FISH FEEDING DEVICE

Emmanuel Vassallo, and Helen I. Vassallo, both of No. 8855 Wyandotte St., East, Windsor, Ontario, Canada

Filed June 2, 1976, Ser. No. 692,130

Int. Cl.² A01K *61/02*

U.S. Cl. 119—51.13 **3 Claims**



1. An automatic aquarium lighting and fish feeding device comprising in combination a flat plate of dimensions to fit the top of an aquarium; a timer of the type having a revolving face and "ON" and "OFF" tabs; at least one rod attached to said "ON" tab and at right angles to said rotating face; a circular turntable located in front of said timer, rotating on a center pin which is fixed to said plate; a wall attached to the periphery of the turntable provided with equally spaced notches in its upper edge by means of which the said timer rod engages the turntable to cause it to rotate; a ring of the same width as the turntable wall concentric with said turntable and spaced from it equipped with notches which correspond with those in the wall of the turntable also for engaging the timer rod; a plurality of equally and radially spaced pins which join the said ring to the wall of the turntable; a plurality of consecutive open end food carrying scoops located in the space between said ring and said turntable; the scoops being pivotally supported by the said radially spaced pins; a single hole through said plate located in the path of said scoops and just large enough to permit the passage through it the open end of a single pivoted scoop; openings in said plate for the passage of light to the aquarium water; and a cover equipped opening in the plate for alternative manual feeding.

4,059,073

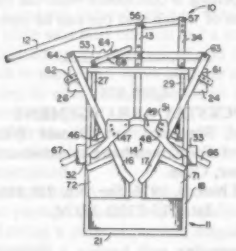
HEAD GATE

Thomas A. Roark, 221 N. Alexander St., Clay Center, Nebr. 68933

Filed Nov. 5, 1976, Ser. No. 739,229

Int. Cl.² A61D *3/00*

U.S. Cl. 119—98 **10 Claims**



1. A head gate comprising:

a. an upright main frame having a pair of transversely spaced side members and a horizontal member affixed at its ends to said side members;

b. a vertical slide member vertically slidably engaged with said horizontal member, said slide member having a first end below said horizontal member and a second end thereabove;

c. an ear block affixed to, and depending from, said first end of said vertical slide member, said ear block including a curved surface for engaging the back of the neck of an animal;

d. a pair of elongate jaw locks pivotally connected, respectively, to said side members such that the lower ends thereof are between said side members;

e. a pair of pivot arms pivotally connected, respectively, to said elongate jaw locks, above the pivot point thereof with said side members, and said vertical slide member, above said horizontal member; and

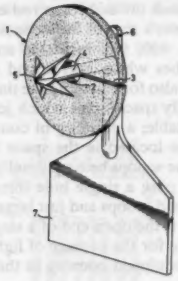
f. means for moving said vertical slide member in a vertical direction whereby said ear block and jaw locks may be selectively moved together to substantially close the opening therebetween or moved apart to increase the opening.

4,059,074

DEVICE AND PROCESS FOR THE CONTROL OF EAR TICKS

Richard Fürer, Basel; Paul Halter, Bottmingen, and Klaus Wettstein, Runenberg, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed June 14, 1976, Ser. No. 695,690
Int. Cl.² A01K *13/00*
U.S. Cl. 119—156 **6 Claims**



1. Device for the control of ear ticks on productive and domestic animals, which device comprises an active-substance carrier and a holding arrangement therefor said holding arrangement comprising a pin made from thermoplastic material, which has at one end a point provided with a barb and at the other end an extension; whereby said active-substance carrier is in the form of a disk made from sintered thermoplastic material, in the surface of which is an opening for the location of said pin, which opening is connected with the rim of the disk by a slot, by means of which said pin can be inserted into said opening.

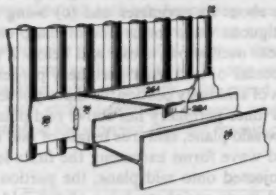
4,059,075

BUCKSTAY ARRANGEMENT

Eugen Ssinegurski, Simsbury, and Donald Wilkinson, West Hartford, both of Conn., assignors to Combustion Engineering, Inc., Windsor, Conn.

Filed Nov. 8, 1976, Ser. No. 739,898
Int. Cl.² F22B *37/24*
U.S. Cl. 122—6 A **6 Claims**

1. A steam generating unit having a rectangular furnace comprised of vertical walls formed by a series of adjacent upright tubes, a buckstay arrangement of horizontal beams extending transversely around the vertical walls of said furnace in spaced arrangement to provide a support therefor, means slidably connecting the vertical tubes of said wall to the buckstay arrangement comprising a tie plate secured to said tube wall including a first flange extending horizontally outward therefrom toward the adjacent buckstay, and an angular retainer having a horizontal flange thereof secured to the first horizontal flange and a vertical flange thereof arranged to slidably embrace an outer surface of said buckstay, said verti-



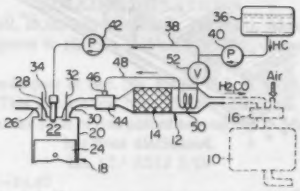
cal flange being bent to present a convex surface that slidably abuts said buckstay to permit pivotal movement therebetween.

4,059,076

METHOD AND APPARATUS FOR GENERATING REFORMED GAS CONTAINING HYDROGEN AND CARBON MONOXIDE FROM HYDROCARBON FUEL

Katsuaki Kosaka, Hidaka, and Zene Ueno, Tokyo, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Apr. 13, 1976, Ser. No. 676,479
Claims priority, application Japan, Apr. 21, 1975, 50-48323
Int. Cl.² F02B *43/08, 75/20;* C10J *3/00*
U.S. Cl. 123—3 **12 Claims**



1. A fuel system of an internal combustion engine, comprising:

an auxiliary internal combustion engine of a smaller displacement than the firstly recited internal combustion engine;

first means for supplying a hydrocarbon fuel to said auxiliary internal combustion engine at such a rate that said hydrocarbon fuel is subjected to combustion in said auxiliary internal combustion engine in the presence of excess air;

a reformer forming therein a reaction chamber adapted to cause partial oxidation reactions of said hydrocarbon fuel to give a gaseous reformed fuel containing as combustible components essentially hydrogen and carbon monoxide;

a first conduit connecting said auxiliary internal combustion engine to said reformer for supplying the exhaust gas of said auxiliary internal combustion engine to said reformer while said exhaust gas is at an elevated temperature;

second means for supplying said hydrocarbon fuel to said reformer at a controlled rate such that said exhaust gas and said hydrocarbon fuel are supplied to said reaction chamber in a predetermined proportion; and

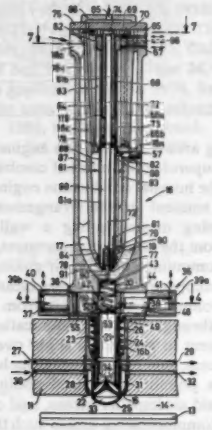
a second conduit connecting said reformer to the firstly recited internal combustion engine for passing therethrough a gas which is discharged from said reaction chamber and includes said reformed fuel.

4,059,077

RECIPROCATING INTERNAL COMBUSTION ENGINE FOR OPERATION WITH FUEL IN POWDER FORM

Anton Steiger, Illnau, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Aug. 16, 1976, Ser. No. 714,812
Claims priority, application Switzerland, Apr. 7, 1976, 4355/76
Int. Cl.[2] F02B *45/00*
U.S. Cl. 123—23 14 Claims



1. In a reciprocating internal combustion engine for operation with fuel in powder form, the combination comprising

an engine cylinder head having a combustion chamber and a piston movably mounted in said combustion chamber;

a valve piston slidably mounted in said cylinder head for movement into and out of said combustion chamber, said valve piston having outlets therein for expelling fuel into said combustion chamber;

a housing mounted on said cylinder head;

a fuel collecting chamber in said housing;

a fuel transfer channel communicating said fuel collecting chamber with said valve piston to deliver fuel into said valve piston;

a closing means disposed intermediately of said fuel transfer channel, said means including a slider block movably transversely of said transfer channel and having a passage therein for selective alignment in said fuel transfer channel, a recess for selective alignment with said fuel transfer channel, a piston movably mounted in said recess, and spring means for biasing said latter piston out of said recess towards said fuel collecting chamber;

a dosing and ejecting member aligned with said transfer channel for expelling a charge of fuel from said fuel collecting chamber through said slider block passage and said transfer channel into said valve piston;

adjusting means for adjusting the position of said dosing and ejecting member relative to said piston in said slider block to vary the charge of fuel therebetween; and

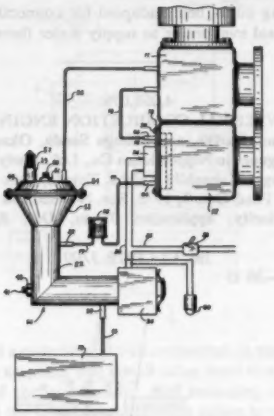
control means for cyclically moving said dosing and ejecting member, said slider block and said valve piston in timed sequence to eject a charge of fuel into said combustion chamber.

4,059,078

STEAM INJECTION APPARATUS

Raul Ramiro de la Rosa, Retorno 805 No. 23, Colonia Centinela, Mexico City 21, Mexico

Continuation of Ser. No. 504,614, Sept. 9, 1976, abandoned. This application July 1, 1976, Ser. No. 701,933
Int. Cl.[2] F02D *19/00*
U.S. Cl. 123—25 K 1 Claim



1. In an internal combustion engine having an accelerator control, an exhaust manifold and an intake manifold, a steam injection apparatus comprising:

a source of water,

a temperature-sensitive switch arranged to operate at a predetermined engine temperative;

a control valve responsive to operation of said temperative-sensitive switch and adapted for connection to a said accelerator control to control the rate of flow of water from said source,

an evaporator arranged to receive water from said control valve and to receive heat from exhaust gases of said engine thereby to evaporate water passing therethrough to produce steam, and

means adapted to transmit steam so produced into a said intake manifold;

said control valve comprising:

a housing,

a water inlet conduit formed in said housing and adapted for connection to said source,

a solenoid actuated valve having a valve member spring biased to close said inlet conduit and a solenoid connected to be energized upon operation of said temperative-sensitive switch to move said valve member against said spring bias thereby to open said inlet conduit to permit flow of water therethrough,

a water passage conduit formed in said housing to receive water from said inlet conduit when said solenoid actuated valve is energized,

a needle valve means to preset maximum flow rate through said water passage conduit and comprising a needle valve member having a conical portion disposed in said water passage conduit,

said needle valve member being adjustable by screw means to cause said conical portion to restrict said conduit to an extent which is in accordance with a desired maximum water flow rate,

a water flow rate control valve having a cylindrical valve member disposed for reciprocal movement in a bore in said housing to receive and control water flowing in said water passage conduit through said needle valve means; said cylindrical valve member having a flow regulating slot, of varying cross-section, in and axially extending

along its periphery, linkage means adapted for connection to said accelerator control to reciprocally move said valve member in said bore in dependence upon movement of said accelerator control, wherein said slot cooperates with an outlet from said housing to vary the flow rate of water from said control valve to said evaporator in dependence on the position of said valve member in said bore so that the greater the opening of the accelerator control the greater the flow rate; and

said housing outlet being adapted for connection to a conduit to said evaporator to supply water thereto.

4,059,079

INTERNAL COMBUSTION ENGINE

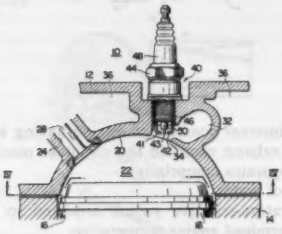
Osamu Kasima, Kariya, and Shougo Sanda, Okazaki, both of Japan, assignors to Nippondenso Co., Ltd., Kariya and Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, both of, Japan

Filed Oct. 7, 1975, Ser. No. 620,506

Claims priority, application Japan, Oct. 8, 1974, 49-122531[U]

Int. Cl.² F02B *3/00*

U.S. Cl. 123—30 D **5 Claims**



1. An internal combustion engine comprising a cylinder block defining therein a cylinder, a cylinder head mounted on the top of said cylinder block, a piston reciprocally mounted in said cylinder and cooperating with said cylinder and cylinder head to define a main combustion chamber, a precombustion chamber adapted to be supplied with a charge of an air-fuel mixture, a passage communicating said precombustion chamber with said main combustion chamber, means for supplying a charge of the air-fuel mixture to said main combustion chamber on an intake stroke of said engine, a part of said charge to said main combustion chamber being forced therefrom through said passage into said precombustion chamber on the succeeding compression stroke of said engine to form a substantial part of said charge to said precombustion chamber, and a spark plug so mounted on said cylinder head as to ignite the air-fuel mixture in said precombustion chamber so that the ignited air-fuel mixture is burnt in said precombustion chamber to produce a torch jet which runs along a path through said passage into said combustion chamber for thereby igniting the air-fuel mixture therein, where said spark plug comprises a generally tubular shell of an electrically conductive material, at least one grounded electrode connected to and extending from one of the end faces of said shell, an insulator axially extending through said shell and having a nose portion extending axially beyond said one end face of said shell, and a center electrode supported by said nose portion of said insulator and extending axially beyond said nose portion, said grounded electrode having a bent end portion extending toward said center electrode to cooperate with the peripheral surface thereof to define a spark gap therebetween, and wherein said center and grounded electrodes extend into said passage to an extent where said electrodes and said nose portion of said insulator are exposed to the rim of a torch jet through said passage.

4,059,080

ENGINE COMPARTMENT VENTILATING ARRANGEMENT

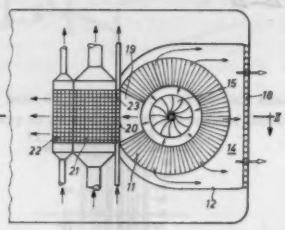
Wolfgang Rudert, Langenargen, Germany, assignor to Motoren- und Turbinen-Union Friedrichshafen GmbH, Germany

Filed Jan. 23, 1976, Ser. No. 651,910

Claims priority, application Germany, Jan. 23, 1975, 2502633

Int. Cl.² F01P *11/08*

U.S. Cl. 123—41.33 **10 Claims**



1. A ventilating arrangement for an engine compartment of a liquid-cooled, supercharged internal combustion engine, the cooling fluid of the internal combustion engine being cooled in a return flow by ambient air, the arrangement comprising: an air guiding housing means having a wall separating said housing means from the engine compartment, means provided in said wall for communicating said air guiding housing means with the engine compartment, a blower means for supplying a predetermined volume of cooling air from said air guiding housing means through said communicating means to the engine compartment to maintain a slight over pressure in the engine compartment, said blower means includes an air impeller means, and a plurality of spaced cooling fins annularly disposed about said air impeller means, said cooling fins being arranged at said communicating means such that a sector shaped area free of any cooling fins is defined at the communicating means whereby said predetermined volume of cooling air from said impeller means flows directly from said impeller means to said communicating means, and wherein a charging air cooler means is arranged directly at said communicating means whereby said predetermined volume of cooling air from said impeller means flows from said air guiding housing means through said communicating means and said air charging cooler means to the engine compartment.

4,059,081

EVAP SYSTEM-PROVIDED THROTTLE VALVE CONTROL UNIT

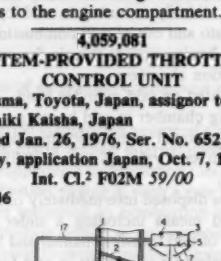
Nobuaki Kayanuma, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Filed Jan. 26, 1976, Ser. No. 652,320

Claims priority, application Japan, Oct. 7, 1975, 50-120250

Int. Cl.² F02M *59/00*

U.S. Cl. 123—136 **5 Claims**



1. A throttle valve control unit having a fuel evaporative emission control system comprising a pressure operative throt-

tle positioner having pressure-operated chamber for opening and closing a throttle valve; a conduit connecting the throttle positioner to an intake pipe or manifold; an air pump for recombustion of the exhaust gas, driven by the engine; a pressure control valve connected to open and close according to the discharge pressure of the air pump; a charcoal canister; a purge hose connecting the canister to the throttle positioner through the pressure control valve device, said pressure control device being opened to connect said pressure-operated chamber to the pressure in the purge hose when the discharge pressure is lower than a prescribed value, whereby the throttle positioner is actuated to open the throttle valve and discharge purge air into the intake pipe or manifold.

4,059,082

FUEL CONSERVATION MEANS FOR INTERNAL COMBUSTION ENGINES AND THE LIKE

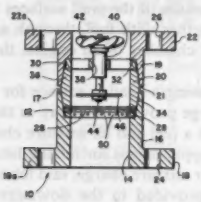
Roger A. McCauley, 3178 E. 26th, Tulsa, Okla. 74114

Continuation of Ser. No. 482,269, June 24, 1974, Pat. No. 3,952,716. This application Apr. 2, 1976, Ser. No. 673,277

The portion of the term of this patent subsequent to Apr. 27, 1993, has been disclaimed.

Int. Cl.² F02M *29/00*

U.S. Cl. 123—141 **14 Claims**



1. A fuel conservation device adapted to be interposed in a flow stream for receiving a fuel-air mixture therethrough and comprising rotor means initially intercepting the fuel-air mixture and being rotated thereby, sonic reed means disposed downstream of the rotor means for impressing sonic vibrations on said fuel-air mixture to facilitate mixing of the fuel and air components thereof, and heated grid means disposed downstream of the sonic reed means for substantial vaporization of the fuel-air mixture.

4,059,083

METHOD AND APPARATUS FOR OBTAINING AN AUTOMATIC IGNITION ADVANCE IN AUTOMOBILE INTERNAL COMBUSTION ENGINE

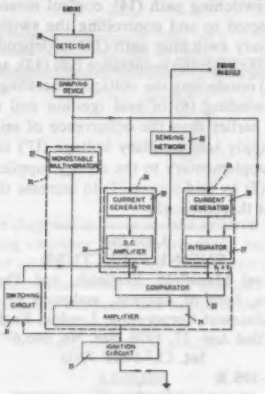
Roger J. Habert, Epinay, France, assignor to Ducellier & Cie, Paris, France

Continuation-in-part of Ser. No. 406,273, Oct. 15, 1973, abandoned, which is a continuation-in-part of Ser. No. 223,627, Feb. 4, 1972, Pat. No. 3,783,850, which is a continuation-in-part of Ser. No. 835,661, June 23, 1969, abandoned. This application Apr. 9, 1976, Ser. No. 675,279

Int. Cl.² F02P *3/02, 1/08*

U.S. Cl. 123—146.5 A **1 Claim**

1. In combination with an internal combustion engine, apparatus comprising a current generator having a current output proportional to speed of rotation of the engine, said current generator supplying an integrator which produces a sawtooth output signal V_1, means for providing an output signal V_3 dependent on at least one of the internal combustion engine operation parameter, means adding signals V_1 and V_3 to produce a voltage $V_1 + V_3$ proportional to angular offset α, means feeding voltage $V_1 + V_3$ to one input of a pulse generator, a tachometric generator supplying a voltage V_2 proportional to the speed of rotation of the engine to another input of the pulse generator, said pulse generator producing a pulse controlling engine ignition when the voltage $V_1 + V_3$ coincides with voltage V_2 consideration being given to a proportionality constant, said pulse generator comprising comparator means having input terminals connected to receive voltages $V_1 + V_3$ and V_2 for delivering a signal to the ignition device when said voltages are coincident by means of an amplifier; and further comprising a monostable multivibrator connected to apply an output signal thereof to the ignition device directly by means of the



amplifier, and a switching circuit connected on one hand to the output of the amplifier and on the other hand to at least one of the inputs of the comparator, said switching circuit being responsive to the triggering of ignition pulses to reinforce said pulses thereby isolating the circuit from the effects of spurious signals.

4,059,084

IGNITION SYSTEM FOR INTERNAL COMBUSTION ENGINES USING AN IGNITION COIL

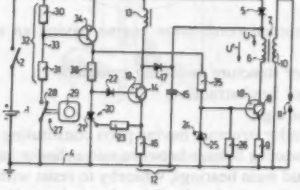
Werner Jundt, Ludwigsburg, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Oct. 1, 1975, Ser. No. 618,573

Claims priority, application Germany, Oct. 12, 1974, 2448675

Int. Cl.² F02P *3/02*

U.S. Cl. 123—148 E **11 Claims**



1. Ignition system for internal combustion engines having a source of electrical energy (1),

and comprising means cyclically timing and commanding generation of ignition energy at an ignition instant,

an ignition coil (7) connected to the source of energy (1) and a blocking circuit (8) forming a switching current path and interrupting current flow from the source (1) through the primary (6) of the coil (7), at the ignition instant;

voltage generating means (12) including a voltage converter, or transformer, connected to said source (1) generating an auxiliary voltage (U') having the same polarity as the voltage applied by said source (1) to said coil, and a voltage level which is higher than the voltage applied to the primary of the ignition coil (7) by said source, (1);

said voltage converter or transformer (12) including an induction coil (13) and an auxiliary switching path (14) connected in series therewith, said coil (13) and switching path (14) series circuit being connected to the current source (1);

a storage capacitor (15) connected across the switching path

(14) and in parallel to the primary winding (6) of the ignition coil and the main switching path (8) to store energy being transferred from said inductance coil and apply said stored energy to the primary winding (6) of the ignition coil,

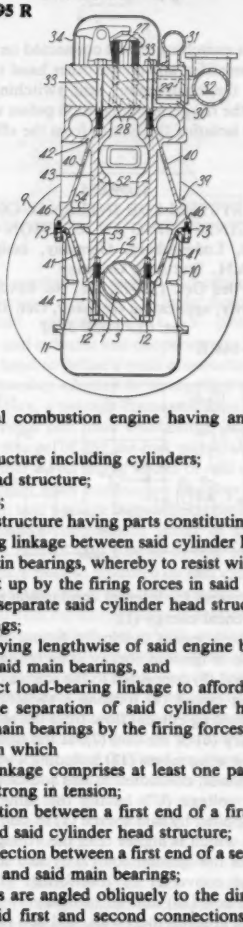
current sensing means (16) connected in series with the auxiliary switching path (14); control means (20, 21, 22, 23) connected to and controlling the switching state of said auxiliary switching path (14) in dependence on current flow through the inductance coil (13); and means (16, 17, 23, 21) connecting the voltage generating means to the primary winding (6) of said ignition coil (7) at a time instant is earlier than the occurrence of said ignition instant to apply said auxiliary voltage (U') to the ignition coil (7) supplementary to the energy supplied to the ignition coil (7) by said source (1) to increase the rate of rise of current therethrough.

4,059,085

ENGINE STRUCTURE

Wilfred Percival Mansfield, Eastleigh, and Theodor Priede, Southampton, both of England, assignors to National Research Development Corporation, London, England

Filed Apr. 27, 1976, Ser. No. 680,677
Int. Cl.[2] F02F 7/00
U.S. Cl. 123—195 R **11 Claims**



1. An internal combustion engine having an engine body including:

a cylinder structure including cylinders;

a cylinder head structure;

main bearings;

said cylinder structure having parts constituting a first direct load-bearing linkage between said cylinder head structure and said main bearings, whereby to resist without bending the load set up by the firing forces in said cylinders and rending to separate said cylinder head structure and said main bearings;

a crankshaft lying lengthwise of said engine body and supported by said main bearings, and

a second direct load-bearing linkage to afford further resistance to the separation of said cylinder head structure from said main bearings by the firing forces set up in said cylinders, in which

said second linkage comprises at least one pair of straight-line links, strong in tension;

a first connection between a first end of a first said link of said pair and said cylinder head structure;

a second connection between a first end of a second said link of said pair and said main bearings;

both said links are angled obliquely to the direct line lying between said first and second connections and to each other, so that unobstructed space is left between said links and said direct line, said first and second ends of each said link thus being transversely spaced from each other;

a third connection is provided between said second ends of said first and second links, and

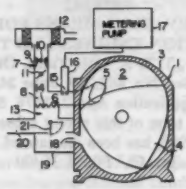
a stabilising member supports said third connection and stabilises it against movement transverse relative to said engine body.

4,059,086

FUEL AND LUBRICATING OIL SUPPLY DEVICE

Haruyoshi Tsubouchi, Katsuta, Japan, assignor to Hitachi, Ltd., Japan

Filed Feb. 3, 1976, Ser. No. 654,753
Claims priority, application Japan, Mar. 5, 1975, 50-25950
Int. Cl.[2] F01M 1/00
U.S. Cl. 123—196 R **6 Claims**



1. In a fuel and lubricating oil supply device wherein lubricating oil for lubrication of the wall surfaces of a combustion chamber is fed, together with fuel, through an intake passage to said combustion chamber of an engine, the improvements comprising:

heating means having a heating surface for gasifying fuel in a mixture charge provided midway in the intake passage through which a fuel and air mixture charge passes; and

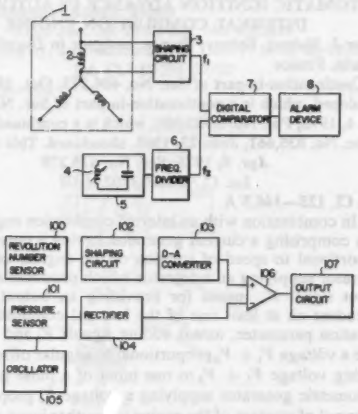
lubricating oil supply means for mixing lubricating oil with said fuel and air mixture charge, said lubricating oil supply means being provided in the downstream side of said heating surface so that the lubricating oil is supplied free from contact with said heating surface.

4,059,087

OIL PRESSURE DETECTING APPARATUS FOR INTERNAL COMBUSTION ENGINES

Takahiko Tanigami, Mito; Akira Hasegawa, and Shigeru Horikoshi, both of Katsuta, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Mar. 31, 1976, Ser. No. 672,144
Claims priority, application Japan, Apr. 4, 1975, 50-40291
Int. Cl.[2] F01M 1/00, 1/04
U.S. Cl. 123—196 S **4 Claims**



1. An apparatus for detecting an oil pressure in an internal combustion engine, comprising:

first means for detecting the number of revolutions of the engine and producing a first signal representative of a critical value of the oil pressure in accordance with the detected number of revolutions;

second means for detecting the oil pressure and producing a second signal representative of an actual oil pressure in accordance with the detected oil pressure; and

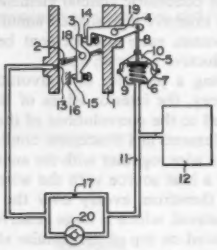
third means for comparing the first signal with the second signal and producing an output when the second signal is smaller than a predetermined level.

4,059,088

THROTTLE POSITIONER

Hidenori Tateno, Nagoya, and Tetsuomi Tamura, Toyota, both of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Filed Dec. 13, 1974, Ser. No. 532,510
Claims priority, application Japan, May 28, 1974, 49-059918
Int. Cl.[2] F02D *11/08*
U.S. Cl. 123—103 R 4 Claims



1. A throttle positioner to ensure a predetermined minimum opening for a throttle valve in an internal combustion engine when the engine is abruptly decelerated from a relatively high-speed condition, comprising a throttle arm connected with a shaft of the throttle valve, a member movable between a first position where it traverses a trace of movement of the throttle arm and a second position where it is held out of said trace, a diaphragm means adapted to operate with the intake vacuum of the engine so as to bias said member toward said second position when the intake vacuum is applied thereto, a port which opens to an intake passage of the engine at a position which is downstream of the throttle valve when it is closed until said throttle arm engages said movable member, and is upstream of the throttle valve when it is opened with said throttle arm not being in engagement with said movable member, and a conduit means which connects said port with said diaphragm means, said port and conduit means including a buffering air chamber and a parallel assembly of a check valve and a constricting orifice means disposed therein, said check valve being oriented to allow fluid to flow only toward said diaphragm means.

4,059,089

FLYING SAUCER LAUNCHING PISTOL

James A. Lehman, El Cajon, Calif., assignor to Warner-Lehman Corporation, El Cajon, Calif.

Filed Sept. 13, 1976, Ser. No. 722,707
Int. Cl.[2] F41B *7/00*
U.S. Cl. 124—27 7 Claims

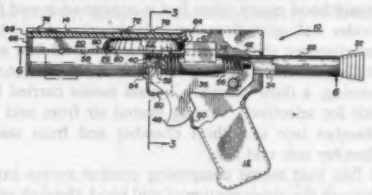
1. A pistol for firing concave disks comprising:

a. a body having a handle and a barrel defining a firing chamber.

b. a spring-loaded plunger in said body operable throughout a firing stroke to eject an inverted concave disk positioned in said firing chamber;

c. trigger means mounted to said body operable to selectively restrain said plunger in a cocked position and release said plunger to eject a disk;

d. said firing chamber being generally rectangular in transverse cross section and having structure defining ramps in the rear lower edges thereof, said ramps having surfaces



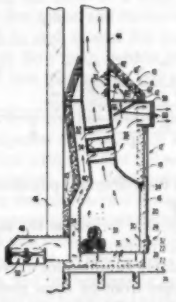
which are diagonal in cross section relative to said rectangular firing chamber and progressively incroach on the volume of said firing chamber toward the rear such that an inverted concave disk dropped into said chamber will be self centering between said ramps under the action of gravity.

4,059,090

FIREPLACE HEATING UNIT

William Stuart Shaw, Prince George, Canada, assignor to Humboldt Holdings, Inc., Georgetown, British W. Indies

Filed Aug. 6, 1975, Ser. No. 602,226
Claims priority, application Canada, June 10, 1975, 226443
Int. Cl.[2] F24B *7/04*
U.S. Cl. 126—121 13 Claims



1. A fireplace heating unit comprising:

a flue;

a housing having a base, upstanding walls and a roof, and having a front opening therein for receiving fuel to be burned, a front vent disposed over the opening for expelling heated air from said housing, and a rear vent for admitting cool, outside air to the interior of said housing;

a firebox mounted within said housing and adapted to contain a fire therein, said firebox having a front opening for admitting fuel to said fire disposed in alignment with and immediately adjacent the front opening of said housing, the rear wall of said firebox being spaced away from the rear wall of said housing to define a first chamber;

hood means mounted on the upper portion of said firebox within said housing for collecting the hot combustion gases from a fire therein said hood means including a front wall portion spaced away from the front wall of said housing to define a second chamber immediately adjacent said front vent;

flue vent means carried by said hood means for venting hot combustion gases collected by said hood means through said housing and into said flue;

heating means carried by said housing for circulating cool outside air, admitted to said first chamber through said rear vent, from said first chamber, through said hood means and into said second chamber, and for expelling at least a portion of said heated air through said front vent whereby said outside air is heated by the combustion gases in said hood means when fuel is consumed in said firebox;

a divider wall extending across the interior of said housing and disposed above the front vent and said first and second chambers, to define, with the upper portion of said housing, a third chamber; bypass means carried by said unit for selectively venting heated air from said second chamber into said third chamber and from said third chamber into said flue;

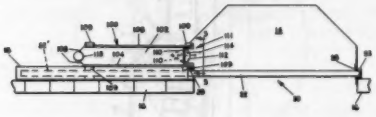
said flue vent means comprising conduit means extending through the upper portion of said hood, through said third chamber and into said flue for communication between the interior of said hood and said flue therethrough said bypass means comprising one-way valve means carried by said conduit means and disposed within said third chamber for admitting heated air from said chamber into said flue through said conduit means without diverting combustion gases therefrom into said chamber.

4,059,091

HEAT SAVING CONCEALED FIREPLACE FRONT

Lawrence R. Cobb, 827-6th Ave., Lake Odessa, Mich. 48849

Filed June 1, 1976, Ser. No. 691,858
Int. Cl.² F24C *15/10*
U.S. Cl. 126—140 **11 Claims**



1. A fireplace front for a fireplace positioned in a room of an enclosure comprising:

a concealed door pocket formed at the side of the fireplace adjacent the front thereof;

a fireplace door slidably mounted for movement into and out of the door pocket from an open position, wherein the door is concealed in the door pocket, to a closed position, wherein the door covers the fireplace opening at the front of the fireplace, the door being formed such that when the fireplace door is closed and a fire is burning in the fireplace, the fireplace opening is sealed so as to substantially prevent air flow from the room into the fireplace; and

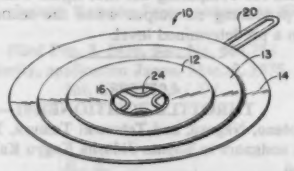
vent means for providing fresh air from outside the enclosure to the interior of the fireplace, said vent means being capable of providing an independent supply of air to the fireplace to keep a fire burning even when the fireplace door is sealed closed, said vent means comprising a vent pocket in the fireplace front and a vent conduit leading from an inlet outside the enclosure to the vent pocket, said vent pocket being formed adjacent and behind the door pocket, an air-tight shield separating the two pockets, the vent pocket having outlet means at the edge of the fireplace for admitting fresh air into the fireplace behind the fireplace door, said vent means further comprising damper means in the outlet means of the vent pocket for opening and closing the vent means, the vent pocket and concealed door pocket being formed as a single integral unit which can be mounted as an assembly into a fireplace during construction of the fireplace.

4,059,092

HEAT DEFLECTOR

Cedric D. Bourboulis, 34 Fountainhead Court, Martinez, Calif. 94533

Filed Oct. 29, 1976, Ser. No. 736,981
Int. Cl.² F24C *15/10*
U.S. Cl. 126—215 **7 Claims**



1. Apparatus for distributing the heat from a heat source relatively uniformly over the lower surface of a cooking utensil, said apparatus comprising:

a plurality of concentric annular elements each including an upwardly concave dish-shaped annulus circumscribing a hollow center, each said element being constructed of heat conductive material; and

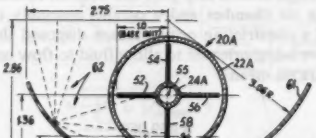
a wire having a plurality of convolutions in a generally planar array, the interior edges of the annular elements being fixed to the convolutions of the wire to mount the annular elements in a concentric configuration to the wire so that the wire together with the annular elements can be laid over a heat source with the wire down to distribute the heat therefrom evenly over the lower surface of a cooking utensil which is large relative to the heat source and is placed on top of the annular elements, or the wire together with the annular elements can be laid over a heat source with the wire up to concentrate the heat therefrom evenly over the lower surface of a cooking utensil which is small relative to the heat source and is placed on top of the annular elements.

4,059,093

SOLAR ENERGY COLLECTOR

Gregory W. Knowles, Huntington; Odd E. Sangesland, Plainview; Henry J. Vroom, Commack, and Robert W. Madey, Huntington Station, all of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Sept. 22, 1975, Ser. No. 615,461
Int. Cl.² F24J *3/02*
U.S. Cl. 126—271 **5 Claims**



1. A solar energy collection system comprising:

a. an elongated, evacuated, substantially cylindrical envelope of transparent material having an orifice at one end thereof;

b. an elongated, substantially cylindrical, sealed container mounted within said envelope, one end of said container projecting through said orifice via an air-tight seal, said container being disposed at an angle with respect to horizontal, said end projecting through said envelope being located at the higher elevation;

c. a vaporizeable liquid located within said container and concentrated at the lower elevation thereof, said fluid, upon vaporization, progressing toward the higher elevation of said container where said vapor gives up heat and condensation takes place;

d. a plurality of axially-aligned, fin-like structures attached to and projecting from said container for enhancing the heat absorption of said container;

e. an inverted, elongate, substantially bilaterially symmetrical, gull-wing shaped reflector located below and external to said envelope and extending for a substantial portion of the length of said envelope for receiving and reflecting incident solar radiation from an area wider than said envelope and for concentrating said radiation on said envelope;

f. a first substantially planar conductive member affixed to the emergent portion of said container for conducting therefrom heat given off by the condensation of said vaporized liquid;

g. a second substantially planar conductive member removably fastened to said first conductive member for conducting heat therefrom; and

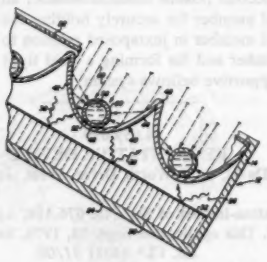
h. a fluid-carrying conduit affixed to said second conductive member for removing heat therefrom and transporting the extracted heat.

4,059,094

SOLAR ENERGY COLLECTOR APPARATUS

Cayo Petronio Barrio de Mendoza, 2402 N. 39th Place, Phoenix, Ariz. 85008

Filed Dec. 4, 1975, Ser. No. 637,714
Int. Cl.² F24J *3/02*
U.S. Cl. 126—271 **13 Claims**



1. Apparatus for collecting solar energy comprising, in combination:

parabolic mirror means for collecting and reflecting solar energy, including a vertex and a focus spaced apart from the vertex;

fluid conduit means disposed on the parabolic mirror means over a predetermined arcuate length adjacent the vertex for absorbing energy from the parabolic mirror means and extending from the vertex to the focus;

heat chamber means disposed adjacent the parabolic mirror means for containing heat energy and for providing the contained heat energy for the parabolic mirror means for transmittal to the fluid conduit means; and

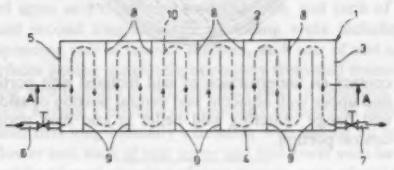
a fluid disposed in the fluid conduit for absorbing heat energy from the fluid conduit means.

4,059,095

DEVICE FOR UTILIZING THE HEAT ENERGY OF SOLAR RADIATION

Edgard Grundmann, Fallersleben; Herbert Heitland, Wolfsburg, and Rudolf Kroll, Vorsfelde, all of Germany, assignors to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

Filed Apr. 9, 1976, Ser. No. 675,594
Claims priority, application Germany, Apr. 9, 1975, 2515398; Sept. 11, 1975, 2540495; Sept. 11, 1975, 2540497
Int. Cl.² F24J *3/02*
U.S. Cl. 126—271 **27 Claims**



1. A device for producing usable heat from solar radiation and which is coilable into a roll comprising in combination:

a first elongated flexible foil having at least one black surface;

a first fluid flow conduit formed by a second flexible foil of a material which is pervious to solar energy positioned adjacent said one surface of said first foil with said first foil and said second foil being connected together in a fluid tight manner, along the outer edges to define a first closed space therebetween, first inlet means and a first outlet means, each communicating with said first closed space, for permitting the flow of a fluid heat carrier medium through said first space, and further sealing connections of said first foil to said second foil positioned to define an extended fluid flow path, within said first closed space, between said first inlet means and said first outlet means; and

a second fluid flow conduit formed by a third flexible foil positioned adjacent the surface of said first foil opposite said one surface with said first foil and said third foil being connected together, in a fluid tight manner, along their outer edges to define a second closed space therebetween, second inlet means and second outlet means, each communicating with said second closed space, for permitting the flow of a separate fluid heat carrier medium through said second space, and further sealing connections of said first foil to said third foil positioned to define an extended fluid flow path, within said second space, between said second inlet means and said second outlet means.

4,059,096

UNITIZED SERVING BASE WITH IMPERFORATE PELLET

Irwin Schneider, Chicago, Ill., assignor to Imperial Arts Corporation, Elk Grove Village, Ill.

Filed May 19, 1976, Ser. No. 687,769
Int. Cl.² F24H *7/06*
U.S. Cl. 126—375 **3 Claims**

1. A food-warming serving base comprising:

a shaped upper wall having a radially outward periphery, and outwardly-upwardly inclined side portion just inwardly thereof, and a generally flat central recessed portion;

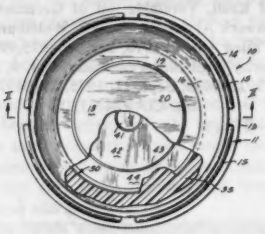
a lower wall sealingly joined to said upper wall about said periphery of said base and spaced vertically from said upper wall at said side and central portions thereof;

a layer of heat-insulating material placed between said upper and lower walls;

a solid, radially-continuous pellet of high heat-absorbency

between said insulating material and said upper wall to contact said upper wall and release heat thereto; and

a thin, raised peripheral flange about said pellet adapted to



contact an undersurface of said inclined side portion of said upper wall adjacent said central portion of said wall, said flange centering said pellet in said base upon said central portion.

4,059,097

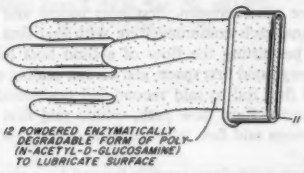
METHOD OF MINIMIZING TISSUE REACTION DURING SURGERY WITH CHITIN

Donald James Casey, Ridgefield, Conn., assignor to American Cyanamid Company, Stamford, Conn.

Filed Nov. 3, 1976, Ser. No. 738,502

Int. Cl.² A61B *19/04*

U.S. Cl. 128—1 R **6 Claims**



1. A method of minimizing tissue reaction in a surgical procedure which comprises contacting living tissue with a natural or synthetic rubber surgical element having on the surface thereof a lubricity imparting quantity of

a finely divided biodegradable powder consisting essentially of

an enzymatically degradable form of poly(N-acetyl-D-glucosamine) selected from the group consisting of poly[N-acetyl-6-O-(carboxymethyl)-D-glucosamine], poly[N-acetyl-6-O-(2'-hydroxyethyl)-D-glucosamine, poly[N-acetyl-6-O-(ethyl)-D-glucosamine], and poly(N-acetyl-D-glucosamine) itself

which form of poly(N-acetyl-D-glucosamine) is slowly enzymatically degraded by contact with body tissues.

4,059,098

FLEXIBLE ULTRASOUND COUPLING SYSTEM

David M. Murdock, Palo Alto, Calif., assignor to Stanford Research Institute, Menlo Park, Calif.

Filed July 21, 1975, Ser. No. 597,413

Int. Cl.² A61B *10/00*

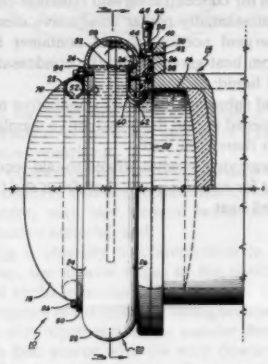
U.S. Cl. 128—2 V **14 Claims**

1. A coupling and closing system for coupling ultrasonic waves even through substantially horizontal coupling paths between a fluid medium contained in a rigid container and a specimen and for confining the fluid medium, said system comprising a flexible supporting bellows system to be fixed at one end over a fluid opening to the rigid container and including:

a first toroidal member of relatively firm but flexible material having first and second opposing side wall portions and an outer peripheral joining and sealing wall portion and being vented to provide fluid communication inside the coupling and closing system;

means for securing one of the side wall portions of said first toroidal member over a fluid opening to the rigid container;

a second flexible ztoroidal member also of relatively firm but flexible material juxtaposed to the first toroidal member and having first and second opposing side wall portions and at least one joining sealing wall portion and being vented to provide fluid communication inside the coupling and closing system;



a thin flexible membrane transparent to ultrasonic waves for closing the supportive bellows system; and

means for securing said flexible membrane over said second toroidal member in fluid-tight relation to the outside of the said second one of the said side wall portions of said first toroidal member;

said thin, flexible membrane being stretched over at least the joining sealing wall portion and the one of said sidewalls of the second flexible toroidal member adjoining the first toroidal member for securely holding the second flexible toroidal member in juxtaposed relation to said first toroidal member and for forming a fluid tight closure for the said supportive bellows system.

4,059,099

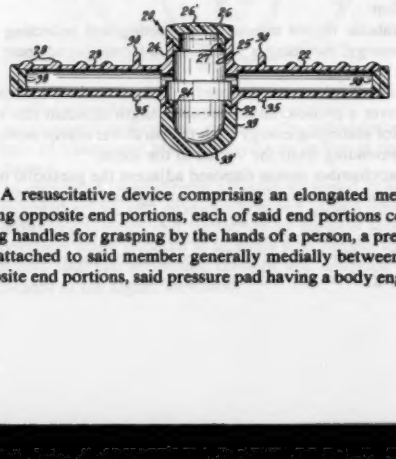
RESUSCITATIVE DEVICE

Belford L. Davis, 4428 Worth Drive, West, Jacksonville, Fla. 32207

Continuation-in-part of Ser. No. 676,419, April 13, 1976, abandoned. This application Sept. 15, 1976, Ser. No. 723,580

Int. Cl.² A61H *31/00*

U.S. Cl. 128—28 **19 Claims**



1. A resuscitative device comprising an elongated member having opposite end portions, each of said end portions constituting handles for grasping by the hands of a person, a pressure pad attached to said member generally medially between said opposite end portions, said pressure pad having a body engage-

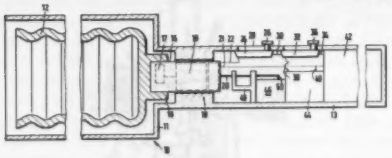
able surface spaced laterally of said end portions to provide sufficient clearance between the hands of a person and a patient's body in contact with said pressure pad during reciprocating relative movement between said device and a patient's body, and laterally extending stops affixed to respective said end portions spaced outwardly from said pad for limiting the hand positioning with respect to said pad, said stops being equidistant from said pad so that equal pressure from the hands of a person may be applied.

4,059,100

MASSAGING APPARATUS

Ulrich Glage, Hamburg, Germany, assignor to Gisela Glage nee Moller, Hamburg, Germany

Filed June 18, 1976, Ser. No. 697,475
Claims priority, application Germany, June 20, 1975, 2528093
Int. Cl.² A61H *1/00, 19/00*
U.S. Cl. 128—36 **10 Claims**



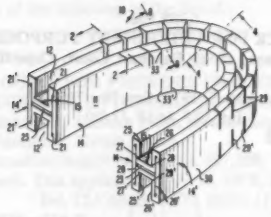
1. A massaging apparatus comprising an elongated hollow sheath having a first end and a second end opposite to each other, said first end being open, means for simultaneously generating two different mechanical vibrations, coupling means for connecting said vibration generating means with said sheath.

4,059,101

THERAPEUTIC DEVICE FOR MASSAGING GINGIVAL TISSUE

Martin Richmond, 2505 S. Ocean Blvd., Palm Beach, Fla. 33480

Filed Mar. 22, 1976, Ser. No. 669,317
Int. Cl.² A61H *7/00*
U.S. Cl. 128—62 A **6 Claims**



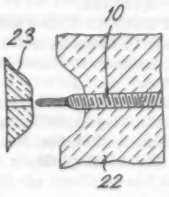
1. A therapeutic device for, inter alia, massaging gingival tissue comprising a body member having an arcuate longitudinal conformation so as to fit the mouth from front to rear, said body member including first and second longitudinally extending webs, and a transverse web bridging between said first and second longitudinally extending webs, said first and second longitudinally extending webs each respectively issuing upwardly and downwardly from substantially opposite ends of said transverse bridging web, said first and second longitudinally extending webs and said transverse web defining upper and lower generally superposed channels in said body member, said upper and said lower channels respectively accomodating teeth in the upper and lower jaws of a user of said device; said transverse bridging web comprising first and second overlying webs of predetermined thickness, said first and second overlying webs defining therebetween an interiorly located continuous transverse slot, said first and second overlying webs being compressible through the area of said transverse slot for elastically impermanently deforming said first and second longitudinally extending webs inwardly towards the clinical crowns of teeth and into the gingivae of a user of said device; said first and said second longitudinally extending webs each carrying at least one interiorly located substantially linear slit extending continuously therethrough, said at least one slit in each of said webs terminating in at least one graduated notch of predetermined configuration, said first and second longitudinally extending webs being respectively expansible about its at least one slit in opposite correspondence to a compressive force exerted upon said transverse bridging web, and each of said first and second longitudinally extending webs including a corresponding pair of interior surfaces, each pair of said interior surfaces issuing incipiently oppositely from said transverse bridging web through a corresponding pairs of chamfers, said chamfers having a continuous emphasis throughout said device; said first longitudinally extending web having an upper and a lower end, each of said upper and said lower ends having a discretely aligned plurality of slots therein, each of said slots opening outwardly into a corresponding upper and lower channel, and said second longitudinally extending web having an upper and a lower end, each of said upper and lower ends having a discretely aligned plurality of slits therein, each of said slits in said second longitudinally extending web corresponding to a slot in said first longitudinally extending web, said first and second longitudinally extending webs being respectively contractable through the areas of their respective slots and slits as a compressive force is exerted through said transverse bridging web for thereby overfitting the clinical crowns of teeth and abutting the gingivae of a user of said device.

4,059,102

BONE SECURING DEVICES

Michael Bertrand Devas, Bexhill-on-Sea, England, assignor to National Research Development Corporation, London, England

Continuation of Ser. No. 599,074, July 25, 1975, abandoned.
This application Sept. 30, 1976, Ser. No. 727,995
Claims priority, application United Kingdom, Aug. 1, 1974, 34014/74
Int. Cl.² A61F *5/04*
U.S. Cl. 128—92 B **2 Claims**



1. A new use for a screw of the type which has a leading end portion with a thread of one hand therearound and a trailing end portion with a thread of opposite hand therearound,

said new use being to connect together two mutually nonrotatable component parts, each of which is one of a fragment of a fractured bone and a fracture fixation device for disposition against said bone and said new use comprising the method of:

screwing one of said end portions of said screw into one of said component parts, and

then screwing the other of said screw end portions into the other of said component parts while partially unscrewing said screw from said one component part to locate said

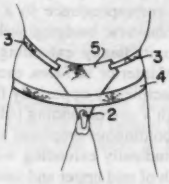
screw through said bone and to effect compressive force on said bone between said component parts.

4,059,103

ABDOMINAL AND HERNIA SUPPORT

Ralph P. Glaser, 2709 Kirkwood Place, Hyattsville, Md. 20782

Filed June 2, 1976, Ser. No. 692,216
Int. Cl.[2] A61F *5/24*
U.S. Cl. 128—96 6 Claims



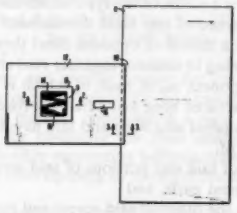
3. An abdominal and hernia support comprising a crotch section shaped so as to be adapted to fit next to a wearer's crotch; a front section having left and right sides and shaped so as to be adapted to fit next to a wearer's abdomen; a rear section having left and right sides and shaped so as to be adapted to fit next to a wearer's buttocks; said crotch, front and rear sections being continuous and being constructed of a plurality of layers of non-elastic fabric; a first elastic band stitched to the left side of the front section and the left side of the rear section and adapted to rest above the left hip of a wearer; a second elastic band stitched to the right side of the front section and the right side of the rear section and adapted to rest above the right hip of a wearer; a third elastic band stitched to the left and right sides of said rear section and adapted for passing around said front section without attachment thereto; a flat flexible stiffener inserted in said front section between said layers of fabric; said crotch section being centrally set with respect to said front and rear sections; said front section being adapted for male wearers by means of an opening to allow passage of the wearer's penis and scrotum, and said flexible stiffener being centrally placed in said front section; whereby said support is used as a two-sided abdominal and hernia support for males.

4,059,104

APPARATUS, PROCESS AND PRODUCT

Donald R. DePriest; Bobby C. Brandon, and Connell M. Buie, all of Columbus, Miss., assignors to Humboldt Products Corporation, Columbus, Miss.

Division of Ser. No. 549,892, Feb. 14, 1975, abandoned, which is a division of Ser. No. 362,451, May 21, 1973, Pat. No. 3,892,617.
This application Feb. 3, 1976, Ser. No. 654,869
Int. Cl.[2] A61B *19/06*
U.S. Cl. 128—132 D 15 Claims



1. A complex disposable specialty drape comprising:

a. an abdominal cover section formed of a medical non-woven material rendered substantially fluid repellant;
b. a T section formed of a medical non-woven material rendered substantially fluid repellant and having laminated thereto a fluid impermeable layer, said T section having a fenestration therein;
c. adhesive means joining an edge of said T section to an edge of said abdominal cover section;
d. a filter; and
e. a filter reinforcement frame affixing said filter over said fenestration.

4,059,105

CANNULA SECURING DEVICE

Jeffrey F. Cutruzzula, Pittsburgh, Pa., and Robert L. Schattner, Baltimore, Md., assignors to Omnimed, Inc., Burlington, N.J.

Filed Mar. 24, 1976, Ser. No. 669,782
Int. Cl.[2] A61M *5/00*
U.S. Cl. 128—133 16 Claims

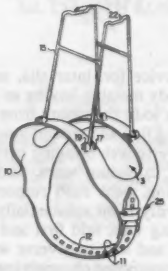
1. A securing device comprising a generally T-shaped lamina having a head and a body portion, said body portion having an opening means confined therein for permitting viewing of a portion of the skin of a subject surrounded by said body portion, said body portion also having adhesive on a first surface to adhere to said subject and said head portion having adhesive on a second surface opposite said first surface and being sufficiently wider than said body portion on both sides to adhere to said subject when superimposed on said body portion.

4,059,106

EAR RACK FOR VETERINARY PURPOSES

Richard D. Shannon, 10510 Barnhart Court, Cupertino, Calif. 95014

Filed Aug. 5, 1976, Ser. No. 711,737
Int. Cl.[2] A61F *13/00*
U.S. Cl. 128—133 5 Claims



1. A veterinary apparatus for use in supporting the ears of an animal, said apparatus comprising:

a flexible base having a strap-like portion extending therefrom;

a rigid frame coupled to the flexible base for coupling to the animal's ears;

latching means coupled to said base for engaging said strap-like portion and for resisting disengagement therewith; and

means coupled to said latching means for allowing a predetermined amount of movement of said strap-like portion when it is engaged with said latching means.

4,059,107

TWO STEP TYPE PRESSURIZED INJECTOR

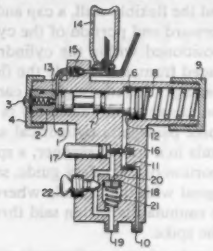
Norio Iriguchi, Oak Park, Israel; Toru Kuroda; Naoya Kominami, and Kenji Inagaki, all of Fuji, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed May 7, 1976, Ser. No. 684,314

Claims priority, application Japan, May 8, 1975, 50-54226

Int. Cl.² A61M *5/30*

U.S. Cl. 128—173 H **7 Claims**



1. A two step type pressurized liquid injector comprising a medicine chamber for holding an injecting liquid, a nozzle hole communicating with the medicine chamber through which the injecting liquid is ejected, a piston slidably positioned within the medicine chamber, a power means connected with the piston, the power means for operating said piston within said chamber whereby liquid therein is ejected under a pressure of at least 120 kg/cm² for a finite time up to 0.05 seconds, and a regulating means for regulating the transfer of the pressure imparted by the power means to the injecting liquid, the regulating means regulating the pressure such that the injection pressure of the injecting liquid is 100 kg/cm² or lower subsequent to said finite time and within 0.05 seconds from the initiation of the injecting of the liquid.

4,059,108

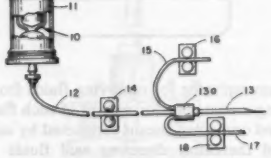
PROCESS FOR PHERESIS PROCEDURE AND DISPOSABLE PHERESIS BOWL THEREFOR

Allen Latham, Jr., Jamaica Plain, Mass., assignor to Haemonetics Corporation, Natick, Mass.

Continuation-in-part of Ser. No. 497,558, Aug. 15, 1974, abandoned. This application July 15, 1975, Ser. No. 596,148

Int. Cl.² A61M *5/00*; B04B *11/00*

U.S. Cl. 128—214 R **31 Claims**



1. A unitary plasmapheresis centrifuge rotor, comprising, in combination:

a. a red cell reservoir in the shape of a centrifuge bowl, said reservoir having a bottom wall which defines a drainage angle of at least 5° and having a whole blood inlet and a plasma outlet;

b. a plasma reservoir in axial alignment with said red cell reservoir;

c. plasma duct means providing fluid communication between the plasma outlet of said red cell reservoir and said plasma reservoir;

d. air vent means communicating with said plasma reservoir; and,

e. means for engaging a centrifuge drive system whereby said centrifuge rotor can be spun to separate whole blood entering said red cell reservoir into a plasma component and a red cell component.

4,059,109

MIXING AND DISPENSING DISPOSABLE MEDICAMENT INJECTOR

Edward A. Tischlinger, 7 Frogbollow Road, East Lyme, Conn. 06333

Filed July 27, 1976, Ser. No. 709,239

Int. Cl.² A61M *5/00*

U.S. Cl. 128—218 M **10 Claims**

1. A mixing and dispensing disposable medicament injector adapted to mix a liquid and a dry medicament and have means for injecting said mixed medicament, said injector comprising:

a cylindrical barrel,

a slidable plunger fitted within and closing the rearward end of the barrel,

a first diaphragm assembly positioned within and closing off the forward end of the barrel,

a second diaphragm assembly sealingly and slidably fitted within the barrel intermediate the ends thereof dividing the barrel into a rearward chamber and a forward chamber, the rearward chamber being adapted to contain the liquid diluent and the forward chamber being adapted to contain the dry medicament, each diaphragm assembly including a flexible wall on its rearward side with a needle mounted so that its one end is closely adjacent said flexible wall, the other needle end establishing fluid communication through the forward side of the diaphragm assembly, whereby when the flexible walls are flexed said walls will be pierced by the respective adjacent needle to allow flow forwardly through the needle, and

said plunger comprises a body portion having its periphery in sealing contact with the barrel, said body portion having a central opening longitudinally therethrough, a flexible member connected to the body portion and closing off the opening, said flexible member being adapted to move forwardly and apply a fluid pressure to the flexible wall of the second diaphragm assembly moving it into piercing contact with the needle of said assembly to establish flow between the rear and forward chambers.

4,059,110

CLOCKWORK DRIVEN HYPODERMIC SYRINGE

Paul Wuthrich, Watertown, and Paul Flumm, Oakville, both of Conn., assignors to Timex Corporation, Waterbury, Conn.

Filed Oct. 7, 1976, Ser. No. 730,557

Int. Cl.² A61M *5/20*

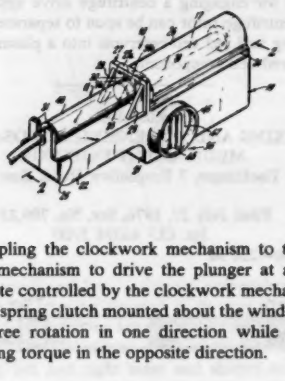
U.S. Cl. 128—218 A **6 Claims**

1. A clockwork device adapted for driving a syringe, wherein said syringe includes an elongated container for fluid and a plunger extending outwardly from the container and slideable therein, said clockwork device comprising:

a housing,

a clockwork mechanism having an escapement controlled gear train mounted within the housing adjacent to the plunger in an extended condition,

a syringe driving mechanism adapted to be coupled to said clockwork mechanism and including a winding shaft with a mainspring mounted thereto and a pinion thereon engaging a rack adapted to drive the syringe plunger, and



means coupling the clockwork mechanism to the syringe driving mechanism to drive the plunger at a predetermined rate controlled by the clockwork mechanism comprising a spring clutch mounted about the winding shaft to permit free rotation in one direction while restraining mainspring torque in the opposite direction.

4,059,111

APPARATUS AND METHOD FOR ORAL DOSING

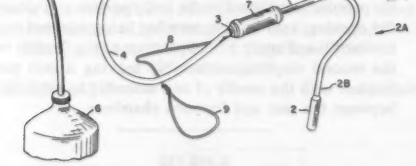
Frans P. G. Erasmus, Kempton Park, South Africa, assignor to Smith Kline & French (Proprietary) Limited, Isando, South Africa

Filed May 25, 1976, Ser. No. 689,754

Claims priority, application South Africa, May 28, 1975, 75/3459

Int. Cl.[2] A61D *7/00*

U.S. Cl. 128—223 **14 Claims**



1. A method for the oral dosing of an animal with a suitable substance including the steps of locating a substantially rigid U-shaped conduit having an offset leg portion in the mouth of the animal so that the leading end thereof points in the direction of the animal's throat and the rear end thereof projects from the side of the animal's mouth and said offset leg portion points in the direction of the animal's rear to allow for the person administering the dose to be in a position next to the animal to facilitate handling the animal; and passing the substance via the conduit into the animal's mouth.

4,059,112

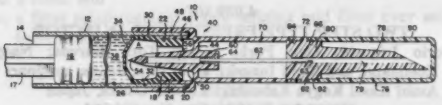
DISPOSABLE ADDITIVE SYRINGE

Edward A. Tischlinger, 7 Froghollow Road, East Lyme, Conn. 06333

Filed Nov. 19, 1976, Ser. No. 743,219

Int. Cl.[2] A61J *1/00*

U.S. Cl. 128—272.3 **6 Claims**



1. A disposable additive syringe having a cylindrical barrel closed at the rear end by a slidable plunger and at the front end by a diaphragm including: a flexible wall facing rearwardly in a convex manner, a medicament chamber formed between the slidable plunger and the flexible wall, a cap and spike assembly mounted on the forward end portion of the cylindrical barrel, said spike being positioned within the cylindrical barrel with its pointed end spaced from and outside the flexible wall, said spike having a passage therethrough, a cannula extending forwardly from the cap and spike assembly in fluid communication with the spike passage, a cylindrical safety guide surrounding the cannula in a spaced manner, a spike mounted on the forward end portion of the safety guide, said spike having a throughbore aligned with the cannula whereby the forward end portion of the cannula fits within said throughbore, and a sheath covering the spike.

4,059,113

ASPIRATORS FOR MEDICAL PURPOSES

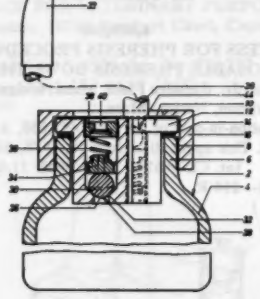
Dieter Beinsen, Geschw. Scholl-str. 12, Salzgitter 1, and Otto Kribitzneck, Dierkinkstr. 14, Walsrode, both of Germany

Filed Sept. 29, 1975, Ser. No. 617,915

Claims priority, application Germany, Nov. 23, 1974, 2456067; Sept. 28, 1974, 2446470

Int. Cl.[2] A61L *1/00*; A61M *1/00*; B65B *31/04*; B65D *51/16*

U.S. Cl. 128—276 **6 Claims**



1. A vacuum aspirator for removing fluids from body cavities comprising a container for receipt of such fluids, a closure for closing said container, means supported by said closure for receiving and thereafter directing said fluids through said closure into said container, combined valve means operatively associated with said closure for sequentially admitting pressurized steam to interior portions of said container and thereafter evacuating the same, said valve means including a first one-way inwardly opening inlet valve portion normally biased in a

closed position to admit steam above a predetermined relative pressure therepast and a second one-way outwardly opening outlet valve portion normally biased in a closed position to permit the passage of gas within said container outwardly thereof during evacuation of said container, said receiving means and said valve means operable to maintain said container under vacuum until use of said aspirator.

4,059,114

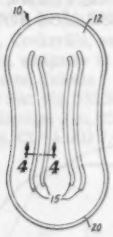
GARMENT SHIELD

Shirley T. Richards, Brooklyn Park, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 685,769, May 12, 1976, abandoned. This application Oct. 22, 1976, Ser. No. 734,747

Int. Cl.² A61F *13/16*

U.S. Cl. 128—287 **20 Claims**



1. A disposable shield for everyday feminine hygiene and garment protection comprising a thin, elongate, highly absorbent pad having (a) a porous, substantially planar hydrophobic polymeric body-contacting surface having a soft, doe-skin like hand, (b) an absorptive portion having differential wetting characteristics from one surface to the other to thus provide for controlled movement of fluid away from the bodycontacting surface, (c) a soft, pliable, rattle-free, body fluid-impermeable barrier and (d) an adhesive positioner means comprising substantially the entire garment-contacting surface, said shield being adapted for attachment to a garment such that the shield will not dislodge, shift or move during wear but is removable from the garment without fabric damage or adhesive residue.

4,059,115

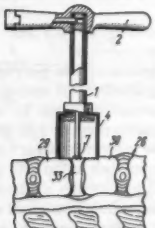
SURGICAL INSTRUMENT FOR OPERATION OF ANTERIOR FENESTRATED SPONDYLODESSIS IN VERTEBRAL OSTEOCHONDROSIS

Georgy Stepanovich Jumashev, Kutuzovsky prospekt. 21/1, kv. 86, and Motel Khaimovich Furman, ulitsa Svobody, 93, kv. 393, both of Moscow, U.S.S.R.

Filed June 14, 1976, Ser. No. 695,407

Int. Cl.² A61B *17/14, 17/16*

U.S. Cl. 128—317 **7 Claims**



1. A surgical instrument for the operation of anterior fenestral spondylodesis in vertebral osteochondrosis, comprising: a hollow elongated cylindrical body; a hollow cylindrical cutter, having a cavity and a cutting edge in a given plane, secured on a distal end of said body coaxially therewith and intended for the simultaneous exicision of two transplants in the shape of cylindrical segments from two adjacent vertebrae separated by an intervertebral slit; a shaft situated in said body coaxially therewith and freely rotatable therein and movable longitudinally with respect thereto; a knife situated in the cavity of said cutter and secured on said shaft for movement jointly therewith, said knife having blades situated in a plane parallel to said given plane, and said blades having a size small enough for introduction of the knife into the intervertebral slit following the removal of an intervertebral disk, said knife being adapted completely to undercut said transplants, after their excision by said cutter, upon subsequent rotation of the knife; a device for securing said shaft relative to the aforementioned body in a position where the cutting edge of the cutter and the blades of the knife lie in approximately the same plane, while preventing the shaft's rotation relative to the body; a limit flange, secured on said shaft and situated within the cavity of said cutter at a distance from the blades of said knife, equal to a predetermined height of the transplants being excised and intended for coming in contact with the surface of said adjacent vertebrae and thereby restricting the depth of the knife's descent into the intervertebral slit; a stop situated at the proximal end of said body, interacting with a proximal end of said shaft during its longitudinal movement towards the proximal end of the body and ensuring thereby, together with said limit flange, a present depth of penetration of the cutter into adjacent vertebrae.

4,059,116

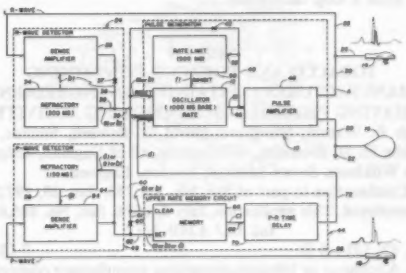
SYNCHRONOUS PACEMAKER WITH UPPER RATE STABILIZATION AND METHOD OF USE

John M. Adams, Minneapolis, Minn., assignor to Medtronic, Inc., Minneapolis, Minn.

Continuation of Ser. No. 530,799, Dec. 9, 1974, abandoned. This application Jan. 12, 1976, Ser. No. 648,352

Int. Cl.² A61N *1/36*

U.S. Cl. 128—419 PG **17 Claims**



15. An atrial synchronous cardiac pacemaker for pacing the ventricle portion of the heart at a rate in synchronism with the natural contraction of the atrium portion of the heart, but at a rate above a lower rate limit and below an upper rate limit, said pacemaker comprising:

an oscillator responsive to a trigger signal for generating an electrical pulse signal adapted to be applied over a lead to the ventricle portion of the heart to elicit a responsive heart beat, said oscillator further being operable to generate said pulse signal upon the absence of any trigger signal for a designated time period, said oscillator including rate limit means for preventing said pulse signals from being generated at a rate exceeding an upper rate limit;

sensing means responsive to the occurrence of a cardiac signal caused by the contraction of the atrium of the heart for providing a signal each time said atrium contracts, said sensing means further including means for inhibiting the response by said sensing means to an atrium contraction

caused signal which occurs during a fixed time, less than said designated time, after the provision of each pulse signal; and

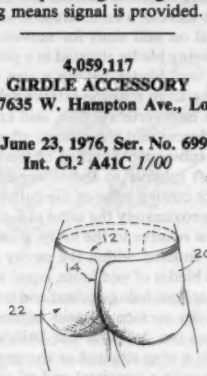
memory means, which in response to said sensing means signal, provides said trigger signal to said oscillator until said pulse signal is generated, said memory means being reset each time a pulse signal is generated and set each time a sensing means signal is provided.

4,059,117

GIRDLE ACCESSORY

Pnina Rosenfeld, 7635 W. Hampton Ave., Los Angeles, Calif. 90046

Filed June 23, 1976, Ser. No. 699,033
Int. Cl.² A41C *1/00*
U.S. Cl. 128—531 **3 Claims**



1. In an accessory for and placeable over a girdle, or the like, comprising

a. a first band length encompassing the girdle horizontally,

b. a second band length branching off a first sector on the first band length, extending vertically downward therefrom substantially along the center front of the girdle at a relatively broad uniform width, decreasingjust prior to reaching the crotch of the girdle to a narrower width passing at said narrower width under the crotch, then vertically upward along the center back of the girdle and terminating at a second sector, located diametrically opposite said first sector on the first band length, so as to form a loop therewith.

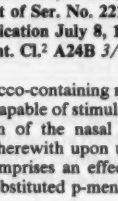
4,059,118

TOBACCO AND TOBACCO-CONTAINING MANUFACTURES CONTAINING AN INGREDIENT HAVING PHYSIOLOGICAL COOLING ACTIVITY

Hugh R. Watson, Wargrave; David G. Rowsell, Staines, and John H. D. Browning, Wokingham, all of England, assignors to Wilkinson Sword Limited, London, England

Continuation-in-part of Ser. No. 221,753, Jan. 28, 1972, abandoned. This application July 8, 1974, Ser. No. 486,651
Int. Cl.² A24B *3/12*
U.S. Cl. 131—8 R **7 Claims**

1. A tobacco or tobacco-containing manufacture comprising tobacco and an agent capable of stimulating the cold receptors of the nervous system of the nasal or oral mucosa when brought into contact therewith upon use of the manufacture, wherein said agent comprises an effective amount of a cold receptor stimulating substituted p-menthane of the formula:



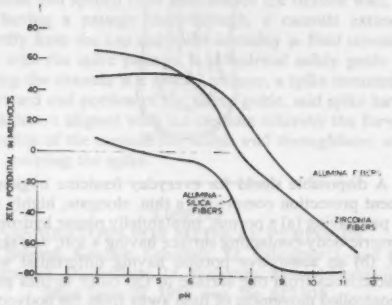
where: R is (i)—$CONH_2$; or (ii)—COOR', where R' is hydrogen; an alkali or alkaline earth metal atom, or an ammonium or substituted ammonium radical; or a radical containing from 2 to 10 carbon atoms and selected from hydroxyaliphatic radicals having a hydroxyl substituent in a 2- or 3-position and a hydrogen atom in the 1-position; a ketal derivative of such a hydroxyalophatic radical with a lower ketone; a lower acyl derivative of such a hydroxyaliphatic radical; a hydroxyaryl radical having a hydroxyl substituent in a 2- or 3-position relative to the ester grouping; a carboxyaliphatic radical having a carboxyl group in a 1-, 2- or 3-position; an alkali metal, alkaline earth metal, ammonium or substituted ammonium salt of such a carboxyaliphatic radical; a lower alkyl ester of such a carboxyaliphatic radical; and a lower alkylene oxide adduct of a hydroxyaliphatic radical having a hydroxyl substituent in a 2- or 3-position and a hydrogen atom in the 1-position.

4,059,119

CIGARETTE AND FILTER

Harold Grossman, Upper Montclair, N.J., assignor to Montclair Research Corporation, Silver Spring, Md.

Continuation of Ser. No. 479,104, June 13, 1974, abandoned. This application May 17, 1976, Ser. No. 687,110
Int. Cl.² A24B *15/00, 15/02, 15/027*
U.S. Cl. 131—9 **24 Claims**



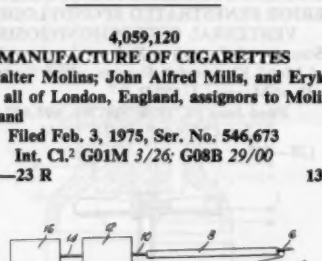
1. In combination, a body of divided tobacco to be burned, a filter for the tobacco smoke resulting from the burning, the tobacco being mixed with a system of particles of a water-insoluble, hydrophobic, moisture-laden, negative charge-imparting substance which releases moisture upon burning of the tobacco, the filter comprising synthetic, inorganic, water-insoluble, anhydrous fibers having a positive zeta potential at the pH of tobacco smoke.

4,059,120

MANUFACTURE OF CIGARETTES

Desmond Walter Molins; John Alfred Mills, and Eryk Stefan Doerman, all of London, England, assignors to Molins Limited, England

Filed Feb. 3, 1975, Ser. No. 546,673
Int. Cl.² G01M *3/26;* G08B *29/00*
U.S. Cl. 131—23 R **13 Claims**



1. A cigarette making system comprising a continuous rod cigarette making machine for producing cigarette portions,

means for combining the cigarette portions with lengths of filter material to form filter tipped cigarettes, a first testing device for detecting leaks in the wrapper of the filter tipped cigarettes, means for feeding the cigarettes to the testing device, and first means associated with the testing device for ejecting faulty cigarettes, in which the cigarette making system includes, upstream of the position at which the cigarettes are tested, means for deliberately producing leaks of predetermined size in the wrapper of selected cigarettes, and monitoring means for detecting whether the cigarettes containing the deliberate leaks are ejected by the first ejection means comprising a second testing device having second ejection means positioned downstream of the first ejection means associated with the first cigarette testing device and arranged automatically to test and eject any of the cigarettes containing the deliberately make leaks which were not ejected by the first ejection means.

4,059,121

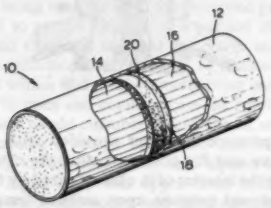
FILTER FOR TOBACCO SMOKE

Warren A. Brackmann, Cooksville, and Daniel Di Ianni, Toronto, both of Canada, assignors to Rothmans of Pall Mall Canada Limited, Toronto, Canada

Continuation-in-part of Ser. No. 352,868, April 20, 1973, Pat. No. 3,882,877. This application Jan. 27, 1975, Ser. No. 544,292

Int. Cl.[2] A24D *1/04*

U.S. Cl. 131—269 **16 Claims**



1. A filter for tobacco smoke comprising a single filter element consisting wholly of a plurality of randomly-oriented non-crimped smooth-surfaced solid fibers of thermoplastic polymeric non-absorbent material, each of said fibers having a uniform diameter less than 5 microns, said filter element having a generally circular cross-section taken across an intended flow path of tobacco smoke and a diameter substantially equal to the diameter of said tobacco smoke flow path, the weight of polymeric material in said filter element exceeding about 6 mg, said filter element having a pressure drop thereacross of from 1 to 10 inches of water at a flow rate of 17.5 ml/sec.

4,059,122

COIN CLASSIFYING AND COUNTING MACHINE

Yoshio Kinoshita, Himeji, Japan, assignor to Glory Kogyo Kabushiki Kaisha, Japan

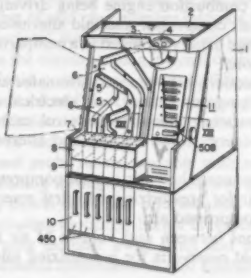
Filed Feb. 5, 1974, Ser. No. 439,837

Claims priority, application Japan, Feb. 10, 1973, 48-17690; Feb. 12, 1973, 48-17618

Int. Cl.[2] G07D *3/04*

U.S. Cl. 133—3 D **3 Claims**

1. In a coin classifying and counting machine including a mixed coin hopper means for collecting and reserving mixed coins of a plurality of denominations, coin delivery means including a revolving disc for conveying coins from said hopper means, a delivery passageway for aligning and delivering in orderly sequence the coins thus conveyed, sorting means positioned at intermediate parts of said delivery passageway for sorting the coins therein by denomination, sorting passageways for conveying by denomination the coins thus sorted, coin counting devices installed in respective sorting passageways to count coins of respective denominations, and a coin receiver section for accommodating in groups by denomination the coins thus counted, the improvement which comprises said coin receiver section being comprised of coin receiving chamber means for storing coins therein in accordance with coin denomination and disposed respectively under said sorting passageways, and a coin collecting means positioned beneath said coin receiving chamber means for receiving coins stored in said chamber means, said coin collecting means and



said chamber means defining a space therebetween, said space comprising means to selectively receive therein further means to selectively allow passage of coins to said coin collecting means from said chamber means or block such passage and remove coins from said chamber means without reaching said coin collecting means.

4,059,123

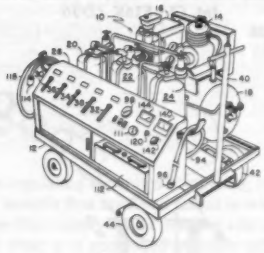
CLEANING AND PRESERVATION UNIT FOR TURBINE ENGINE

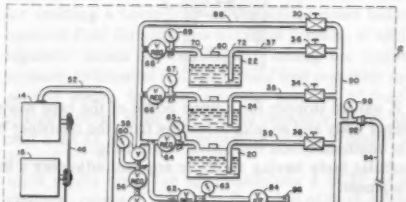
Joseph S. Bartos, and Robert J. St. Onge, both of Trumbull, Conn., assignors to Avco Corporation, Stratford, Conn.

Filed Oct. 18, 1976, Ser. No. 733,627

Int. Cl.[2] B08B *3/02, 3/10;* **F04B** *21/00*

U.S. Cl. 134—102 **6 Claims**





1. Apparatus for cleaning and preservation of a gas turbine engine, said engine having a starting motor for cranking the rotary compressor stages thereof, comprising in combination:

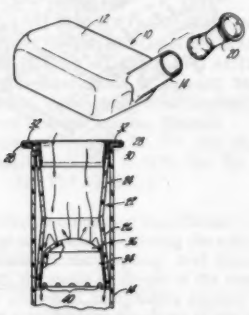
a frame structure having supporting wheels journaled for rotation;
a first reservoir mounted on said frame, said first reservoir being partially filled with water;
additional reservoirs for cleaner, solvent and preservative solutions mounted on said frame;
an internal combustion engine, a control console, a rotary air compressor and an alternator also mounted on said frame, said internal combustion engine being drivingly coupled to both said air compressor and said alternator;
an electric storage battery mounted in a compartment of said control console;
electrical connections between said alternator and said battery for charging said battery, said electrical connections including operator-manipulated control means for controlling the energy transfer from said alternator to said battery;
fluid connection means between said air compressor and said first reservoir for pressurizing said first reservoir with a volume of compressed air;
fluid connections between said volume of air and each of said additional reservoirs for pressurizing said additional reservoirs;
manually operable controll means in each of said connections for controlling the pressurization of each of said reservoirs;
nozzle apparatus mountable on said gas turbine engine for spraying the inside thereof with fluids;
means for connecting each of said reservoirs to said nozzle apparatus, said means including a high pressure hose selectively connected to said reservoirs; and
encircuiting means including a two-conductor electrical cable connecting said battery to said starting motor for cranking said rotary compressor stages.

4,059,124

VALVED STOPPER FOR A URINE BOTTLE

Edward J. Hill, 1660 Lochridge Road, Bloomfield Hills, Mich. 48013

Filed Jan. 26, 1976, Ser. No. 652,241
Int. Cl.[2] F16K *17/36*
U.S. Cl. 137—38 **12 Claims**



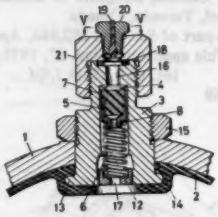
1. A valved stopper for a urine bottle of the type having a container body and an inlet extending from the container body and in communication therewith, comprising:
a tubular body having an upper segment adjoining a lower segment,
the upper segment being dimensioned at its uppermost portion to be closely received in the inlet opening to provide a close fit therein,
the lower segment being tapered outwardly from the point of juncture with the upper segment;
means for retaining the tubular body within the bottle inlet; and
a gravity controlled valve member, having a hollow tapered shape complementary to the lower segment and open at its lower end, freely disposed within the lower segment and retained therein by stop means on the lower segment, the valve member being adapted to sealingly engage the inner surface of the lower segment when directed toward the inlet opening and thereby block flow from the bottle,
whereby the open lower end of said valve member is adapted to receive liquid escaping from within said bottle to urge said valve member into sealing engagement with said inner surface and act to trap said liquid and prevent escape thereof.

4,059,125

PRESSURE CONTAINER WITH AN INJECTION VALVE PROVIDED WITH A FUSIBLE VALVE MEMBER

Nobuyuki Sugimura, and Kazuo Sugimura, both of 1416 Sodeshi-cho, Shizuoka, Shimizu, Japan

Filed Nov. 9, 1973, Ser. No. 414,502
Int. Cl.[2] F16K *17/38*
U.S. Cl. 137—73 **7 Claims**



1. A fluid pressure container provided with an injection valve and valve seat for communicating the exterior of said container with the interior of it, characterized by the provision of relief of internal pressure upon ambient temperature rise including:
a. a hollow valve stem slidably disposed within said injection valve and having at least one passageway extended therethrough, said passageway providing the only path for escape of fluid from within the container to the exterior of the container, and
b. a fusible valve member filling said hollow valve stem and having a portion of the fusible member in contact with the valve seat of said injection valve providing the sole valve closing function by such contact with the valve seat to retain pressurized fluid in the container, said fusible valve member closing said passageway in said valve stem by said filling the hollow thereof, the injection valve having a fluid passage beyond said seat to the exterior of said container for flow of said fusible valve member under conditions of elevated ambient temperature to open both the passage through the hollow valve stem and said injection valve by removal of the fusible material to the exterior of the container.

4,059,126

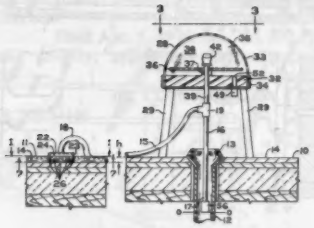
SOLAR ACTUATED SIPHON DRAIN

Malcolm Horace Nickerson, Chagrin Falls, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Aug. 16, 1976, Ser. No. 714,867
Int. Cl.[2] F16L *43/00*
U.S. Cl. 137—142 **8 Claims**

1. A solar actuated siphon for transferring liquid from an upper level to a lower level, said siphon having an inlet for immersion in said liquid at said upper level and an outlet at said lower level, an enclosed container having a chamber in communication with said siphon, first valve means between said siphon and said chamber, said first valve means being responsive to open when gaseous fluid pressure in said chamber is less

than the fluid pressure in said siphon and to close when the fluid pressure in said chamber is greater than the fluid pressure in said siphon, second valve means between said chamber and the space at atmospheric pressure outside said container, said second valve means being responsive to open when the gaseous fluid pressure in said chamber is greater than atmospheric pressure by a predetermined amount and to close at lower fluid pressures, a third valve means at said outlet being responsive to open when the fluid pressure in said siphon exceeds atmospheric pressure by a predetermined amount and to close at lower fluid pressure, means associated with said chamber for absorbing radiant solar energy to heat and thereby increase the pressure of gaseous fluid within said chamber, said second



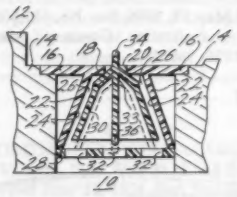
valve means being responsive to the increased pressure of said gaseous fluid to permit ejection of a portion of said gaseous fluid from said chamber, and said first valve means being responsive to a reduction in pressure of the remaining portion of gaseous fluid within said chamber on cooling causing said first valve means to open and communicate the resulting subatmospheric pressure in said chamber to said siphon, said third valve means maintaining a closed outlet and said subatmospheric pressure being communicated to said siphon and said inlet causing said liquid from said upper level to flow into said siphon and towards said outlet, said third valve means opening upon filling of said siphon with said liquid whereby said liquid is transferred from said upper level to said lower level.

4,059,127

SELF-CLEANING NON-RETURN DRAINAGE VALVE

Leonard J. Olson, R.R. 1, Topeka, Ill. 61567

Filed Feb. 27, 1976, Ser. No. 662,024
Int. Cl.[2] E04H *13/00*; F16K *51/00*
U.S. Cl. 137—244 **9 Claims**



1. A non-return drainage valve adapted for use with a container to allow the drainage of fluids from the container through said valve and to prevent the passage of liquids through said valve into the container, comprising:

a drain port having a seating surface,

a bouyant plug member movable towards said port and against the port seating surface for closing the valve in response to the bouyant force of backflowing liquids on the discharge side of the port;

plug member retaining means for guiding and retaining said plug member in alignment with said port defining a plurality of apertures therein for allowing the flow of fluids therethrough and for restricting the passage of debris thereinto, said retaining means having a peripheral clearance around said plug member to allow lateral movement and reduce friction between the plug member and retaining means;

a port probe means movable with said plug member and extending through said port for clearing debris from the port and precluding blockage of the port in response to movement of said plug member into said port, the exterior cross-sectional dimensions of said port probe means being less than the corresponding internal cross-sectional dimensions of said port by an amount sufficient to allow lateral movement of said port probe means within said port to reduce friction when said port probe means moves into and out of said port; and

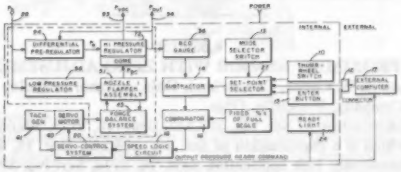
an additional probe means movable with said plug member and extending through selected ones of said apertures for clearing debris from said selected ones of said apertures and precluding blockage thereof in response to movement of said plug member away from said port, the exterior cross-sectional dimensions of said additional probe means being less than the corresponding internal cross-sectional dimensions of said apertures by an amount sufficient to allow lateral movement of said additional probe means within said apertures to reduce friction when said additional probe means moves into and out of said apertures.

4,059,128

DIGITAL PRESSURE STANDARD

William Albert Heske, Fairfield, and Christopher Peter Grudzien, Milford, both of Conn., assignors to Dresser Industries, Inc., Dallas, Tex.

Filed Mar. 12, 1976, Ser. No. 666,288
Int. Cl.[2] G05D *16/20*
U.S. Cl. 137—487.5 **14 Claims**



1. Pressure regulating apparatus comprising in combination:

a. variably settable first regulator means in which to receive a pressure fluid supply from a pressure source and emit the received fluid at a controlled pressure differential from that at which it is received;

b. variably settable second regulator means receiving the emitted fluid from said first regulator means and operative for emitting a controlled differential pressure output of received fluid for supply as a control pressure to said first regulator means for controllably setting the controlled pressure differential emitted by said first regulator means;

c. sensing means for measuring the pressure of fluid discharge emitted from said second regulator means and to emit a BCD signal corresponding to the pressure value thereof;

d. input means operative for establishing a BCD set point pressure command signal for the value of fluid discharge from said second regulator means; and

e. logic means receiving said BCD signals from said sensing means and said input means and operatively effective in response to the signal differential therebetween to repetitively reset said second regulator means for reducing said signal differential until the value of output pressure from said second regulator means corresponds to the set point pressure command signal of said input means.

4,059,129

CYLINDRICAL BODY PROVIDED WITH MEANS FOR COUNTERACTING VIBRATIONS RESULTING FROM A TRANSVERSELY FLOWING FLUID

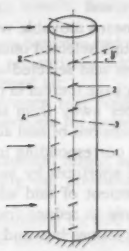
Nikolaas Feis, Apeldoorn, Netherlands, assignor to Nederlandsche Organisatie Voor Toegepast-Natuurwetenschappelijk Onderzoek Ten Behoeve Van Nijverheid, The Hague, Netherlands

Filed Feb. 6, 1976, Ser. No. 655,829

Claims priority, application Netherlands, Feb. 18, 1975, 7501866

Int. Cl.² F15D *1/00*

U.S. Cl. 138—37 8 Claims



1. A cylindrical body that at the outer periphery is provided with means for counteracting vibrations of said body resulting from a transverse flow against the outside of said body, wherein said means comprise a plurality of small planes which extend on substantially a perpendicular direction from the outer surface of said cylindrical body and which form an angle of 5°–25° with a cross-section of said cylindrical body which is perpendicular to the axis of said body and have a greater length than width which are mounted substantially perpendicular to the outer surface of said cylindrical body.

4,059,130

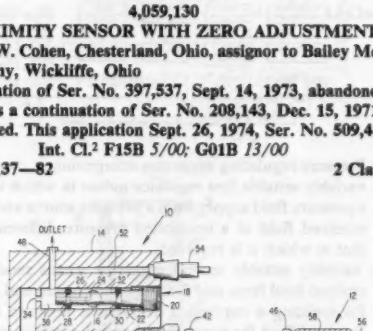
PROXIMITY SENSOR WITH ZERO ADJUSTMENT

Kenneth W. Cohen, Chesterland, Ohio, assignor to Bailey Meter Company, Wickliffe, Ohio

Continuation of Ser. No. 397,537, Sept. 14, 1973, abandoned, which is a continuation of Ser. No. 208,143, Dec. 15, 1971, abandoned. This application Sept. 26, 1974, Ser. No. 509,456

Int. Cl.² F15B *5/00*; G01B *13/00*

U.S. Cl. 137—82 2 Claims



1. In a proximity sensor, the combination comprising an emitter assembly having a cylindrical passageway, a fixed orifice disposed in said passageway dividing the passageway into an output chamber and a b ack pressure chamber, a sensing nozzle connected to said back pressure chamber for wasting pressure fluid from the back pressure chamber in inverse proportion to the proximity of an object to the sensing nozzle, an orifice tube located within said output chamber axially aligned with said fixed orifice adapted to be connected to a source of pressure fluid and discharge a jet of pressure fluid through said fixed orifice into said back pressure chamber, and means for axially positioning said orifice tube to thereby vary the pressure in said output chamber for a given pressure in said back pressure chamber.

4,059,131

JACQUARD SELECTION SYSTEM

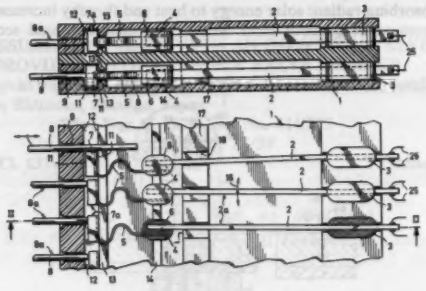
Robert R. Bucher, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Feb. 3, 1976, Ser. No. 654,784

Claims priority, application Switzerland, Feb. 7, 1975, 1518/75

Int. Cl.² D03C *3/20*

U.S. Cl. 139—59 14 Claims



1. A jacquard selection system for selecting warp yarns of a weaving machine, said system comprising:

a plurality of multimorphous bending elements,

a plurality of jacquard needles, each said needle being disposed to move between a non-sensing position and a sensing position to sense the position of a respective bending element;

a guide including a wall opposite said needles; and

a plurality of sliders, each said slider being separably mounted from a respective bending element and being reciprocally mounted within said guide between each bending element and a respective jacquard needle to selectively inhibit a sensing movement of said respective needle, each said slider being disposed in abutment with said wall in a sensing position of said respective needle without stressing of a respective bending element.

4,059,132

BOBBIN RETAINER ON A SHUTTLE

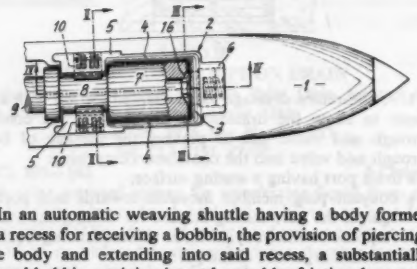
Theodor Kenk, Karlsruhe, and Erhard Kenk, Vaihingen, both of Germany, assignors to Leder & Co., AG, Kt. St. Gallen, Switzerland

Filed May 17, 1976, Ser. No. 687,030

Claims priority, application Germany, May 17, 1975, 2522146; Feb. 4, 1976, 2604153

Int. Cl.² D03J *5/16*

U.S. Cl. 139—207 5 Claims



1. In an automatic weaving shuttle having a body formed with a recess for receiving a bobbin, the provision of piercings in the body and extending into said recess, a substantially U-shaped bobbin retaining insert located by frictional engagement in said recess and having anchoring pegs corresponding to and engaging the piercings also to retain the insert within the recess, said insert being formed with two legs and a cross-

piece connecting said legs, sliding guides formed in said legs and arranged in pairs on both sides of the central longitudinal plane of the bobbin. Bobbin retaining dogs movable within said sliding guides, helical springs urging the dogs into engagement with the bobbin for retaining the bobbin in the recess, a projection on the crosspiece, a spigot slidably mounted in the projection and extending through the crosspiece and a helical spring arranged within the projection to urge the spigot into engagement with the bobbin for centering the bobbin within the recess.

4,059,133

WEFT INSERT APPARATUS FOR RIBBON LOOMS

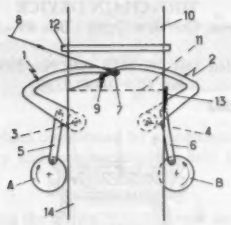
Ferdinand Diesner, Spittelweg 1, D-8998 Murg-Hanner, Germany, and Robert Bucher, Frickbergstrasse, CH-5262 Frick, Switzerland

Filed Apr. 5, 1976, Ser. No. 673,819

Claims priority, application Switzerland, Apr. 4, 1975, 4275/75

Int. Cl.² D03D *47/02*

U.S. Cl. 139—440 **5 Claims**



1. A weft insert apparatus for a shuttleless loom, especially a ribbon loom, comprising two cooperating weft insert elements each having a free end, means mounting said weft insert elements for movement towards and away from one another such that their free ends describe curves, drive means cooperating with said weft insert elements for pivotably driving said weft insert elements towards and away from one another, one of said weft insert elements being provided at its free end with means for the infeed of the weft thread, the other weft insert element being provided at its free end with means for seizing the weft thread, said seizing means comprises a hook, the means mounting the weft insert element possessing a hook includes a pivot shaft, the hook of said weft insert element possessing a web directed approximately radially with respect to the free end of the weft insert element mounted at said pivot shaft, an enlarged portion formed at one end of said web and pointing in the direction of a loop of the weft thread, said enlarged portion containing a shoulder which extends approximately transversely with respect to the web.

4,059,134

MOBILE DRUM FILLING ASSEMBLY

Theodore T. Violette, 2603 Wall St., Long Beach, Calif. 90804

Filed June 21, 1976, Ser. No. 697,988

Int. Cl.² B65B *31/00*; B67D *5/00*

U.S. Cl. 141—59 **6 Claims**

1. A portable device that may be moved adjacent a bulk liquid holding tank having a liquid inlet and liquid outlet to sequentially dispense predetermined weighted quantities of said liquid into a plurality of drums, each of said drums being of the type that includes a bottom and an upwardly disposed head that has a bung hole therein that may be removably closed by a stopper, said device including:

a. an elongate rectangular portable bed having a first forwardly disposed end and a second rearwardly disposed end, and first and second longitudinal sides;

b. a frame work extending upwardly from said bed;

c. first, second and third elongate conveyors having first forward ends and second rearward ends, said conveyors supported from said frame work in elevated positions above said bed and extending longitudinally relative to the latter, said first conveyor adjacently disposed to said first side of said bed, said second ends of said conveyors adjacently disposed to said second end of said bed, said first conveyor angularly disposed to the extent that drums placed on said second end thereof move by gravity to said first end thereof, and said second and third conveyors angularly disposed to the extent that drums placed on said first ends thereof move by gravity to said second ends thereof;

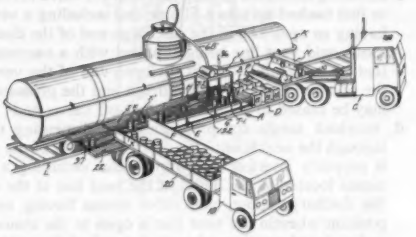
d. a first conduit removably connectable to said liquid outlet of said tank;

e. power-operated means for establishing a sufficient differential in pressure between liquid in the interior of said tank and the interior of said first conduit that liquid in said tank will flow into said first conduit;

f. an engine on said bed for driving said power-operated means;

g. first and second laterally spaced scales that have first and second laterally spaced weighing platforms that are supported from said bed adjacent said first end thereof, said first and second weighing platforms longitudinally aligned with said second and third conveyors and disposed adjacent said first ends thereof;

h. a horizontal floor supported from said frame work adjacent said first and second scales on which an operator may



stand to sequentially remove drums from said first end of said first conveyor and place them on said first and second weighing platforms to be filled with said predetermined weighed quantities of said liquid, with said drums on said first and second weighing platforms after having said predetermined weighed quantities of said liquid dispensed therein having said stoppers disposed in said bung holes, and said operator moving filled drums from said weighing platforms onto said second and third conveyors to permit said filled drums to coast by gravity to said second ends of said second and third conveyors;

i. a horizontal platform supported by said frame work adjacent said second end of said first conveyor on which a person may stand to move empty drums onto said first conveyor and to tighten the stoppers in bung holes of filled drums that move towards said second end of said bed on said second and third conveyors;

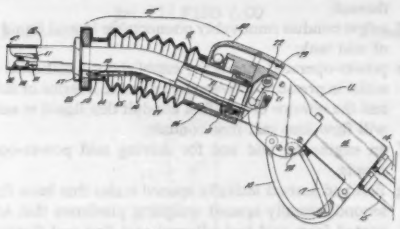
j. an elevated valved dual hose assembly above said first and second weighing platforms that receives liquid from said first conduit, said dual hose assembly including first and second tubular valved portions that extend into said bung holes of first and second drums on said first and second weighing platforms to permit said first and second drums to have said liquid concurrently dispensed thereinto from said first conduit; and

k. second means operatively associated with said dual hose assembly for preventing fumes from said liquid being dispensed into said drums on said first and second weighing platforms escaping to the ambient atmosphere.

4,059,135
INTERLOCK SYSTEM FOR A FUEL DISPENSING NOZZLE

William B. Hansel, Media, Pa., assignor to Suntech, Inc., St. Davids, Pa.

Continuation-in-part of Ser. No. 635,189, Nov. 25, 1975, Pat. No. 4,011,897. This application July 12, 1976, Ser. No. 704,212
The portion of the term of this patent subsequent to Mar. 15, 1994, has been disclaimed.
Int. Cl.[2] B65B *57/06*
U.S. Cl. 141—207 6 Claims

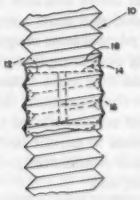


1. A nozzle for dispensing fuel into a fillpipe of a motor vehicle fuel tank and comprising:
   a. a discharge spout for insertion into a fillpipe of a motor vehicle fuel tank;
   b. a shut-off valve for shutting off fuel being dispensed by the nozzle;
   c. actuating means for closing said shut-off valve in response to fuel backed up into a fillpipe and including a vent line having an open end at the discharge end of the discharge spout, said vent line being supplied with a vacuum such that when gasoline covers the open end of the vent line, the pressure in the vent line drops and the pressure drop may be sensed to actuate said shut-off valve; and
   d. interlock means for preventing the dispensing of fuel through the nozzle until the discharge spout of the nozzle is properly inserted in a fillpipe and including a valve means located at the outlet of the vent line at the end of the discharge spout, said valve means having an open position wherein the vent line is open to the atmosphere and a closed position wherein the end of the vent line is sealed closed, and means, responsive to the nozzle being inserted in the fillpipe a predetermined distance and the lower side of the discharge spout being urged against the inside of a fillpipe inlet, for actuating the valve means so that the valve is placed into its open position, thereby permitting the dispensing of fuel.

4,059,136
THREAD LOCK

Richard B. Wallace, Bloomfield Hills, Mich., assignor to The Oakland Corporation, Troy, Mich.

Continuation-in-part of Ser. No. 550,831, Feb. 18, 1975, abandoned. This application June 30, 1976, Ser. No. 701,107
Int. Cl.[2] F16B *39/02*
U.S. Cl. 151—14.5 14 Claims

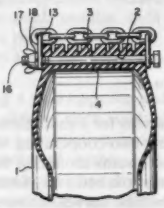


1. A thread lock construction comprising a body having threads formed thereon provided with two physically separated deposits of fluid components which when reacted together form a solid locking material in the thread grooves at a circumferentially extending zone on said body comprising a plurality of consecutive thread convolutions extending around said body, one of said deposits extending only partly around said body within said zone, the other deposit being located on substantially the same consecutive thread convolutions within said zone and extending around said body in position to bring one of the circumferentially separated edges of said other deposit initially into contact with the adjacent one of the circumferentially separated edges of the said one deposit, said deposits being fluid and capable of being spread and intermixed by engagement with a mating threaded body, a thin barrier of solid material formed by reaction between the two deposits at the initially contacting edges thereof constituting a barrier between said deposits which limits reaction therebetween, a rupturable thin film of dry non-tacky protective material overlying both deposits and barrier, the solid barrier between said zones forming mechanical mixing elements to improve the intermixing of the materials of said deposits when said body is threadedly engaged with a mating threaded body.

4,059,137
TIRE-CHAIN DEVICE

Edmund T. Green, Golfview Drive - Box 69 - 1B, Hadley, N.Y. 12835

Filed July 28, 1975, Ser. No. 599,501
Int. Cl.[2] B60C *27/02*
U.S. Cl. 152—232 1 Claim



1. A combination pneumatic tire-chain device comprising:
   a tire having a crown, including treads and a crown core below said treads, said crown core being provided with a plurality of openings extending parallel to the axis of the tire and uniformly spaced around the tire extending through the crown core from one side wall thereof to another side wall thereof;
   a plurality of bolts, each having a length larger than each of said openings and complementary in cross-secton to that of said openings and threaded at one free end, and having a hexagonal-shaped bolt head at the other end;
   a chain comprising a plurality of links, including end links, one end link of which is coupled to said other end of each of said bolts adjacent said bolt head, said chain being adapted to be placed over the outer periphery of the tire on said treads when the bolt is inserted in said opening, said chains being uniformly spaced along said treads, leaving a major portion of said treads exposed;
   a first-connecting member having a bolt opening substantially complementary to said one free end of the bolt and connected to the other end link of said chain and having a flat surface for abutting a side wall of the tire adjacent the opening;
   locking bolt means releaseably threadably engaging the threaded free end of said bolt and securing said bolt thereto and pressing said flat surface of said first connecting member against said side wall of the tire, said locking bolt means comprising a wing nut and a spring-biased annular lock washer secured to said wing nut; and
   a second-connecting member for connecting the said one end link of said chain at said bolt head of said bolt to said bolt, said second-connecting member being permanently

secured to said bolt, and having a flat surface adapted to abut the other side wall of said tire when said bolt means secures said bolt, said first and second-connecting members constituting discs, each having a chain opening receiving end links of said chain, said chain openings of said first- and second-connecting members and said bolt opening of said first-connecting member being radially offset relative to the center of the respective disc, with the bolt opening of said first-connecting member being larger than said chain openings.

4,059,138

RUN-FLAT TIRE AND HUB THEREFOR

Henri J. Mirtain, and Andre M. Devienne, both of Compiegne, France, assignors to Uniroyal, S.A., Clairoix, France

Continuation of Ser. No. 376,983, July 6, 1973, abandoned. This application Sept. 16, 1976, Ser. No. 724,047

Claims priority, application France, Aug. 11, 1972, 72.29183

Int. Cl.[2] B60C *17/04, 15/00, 13/00*

U.S. Cl. 152—330 RF **14 Claims**

1. A vehicle wheel constituted by a pneumatic tire having a run-flat capability and a hub on which said tire is mounted comprising:

a carcass;

a tread overlying the crown region of said carcass in circumferentially surrounding relation to the latter;

first and second sidewalls overlying the lateral portions of said carcass,

said first and second sidewalls terminating in first and second beads respectively at their radially inwardmost ends and merging into said tread at their radially outwardmost ends,

the axially outwardmost portions of said sidewalls being generally intermediate the radially inwardmost and outwardmost ends thereof and extending axially outwardly of the axially outwardmost portions of said tread,

each of said sidewalls having an annular groove formed therein generally intermediate its radially inwardmost and outwardmost ends for folding each of said sidewalls axially outwardly along sharply defined annular lines upon deflation of the tire,

said grooves being formed at locations in said sidewalls corresponding to the axially outwardmost portions of said sidewalls when the tire is deflated under load,

said grooves dividing said sidewalls along said sharply defined annular line each into a radially inner portion and a radially outer portion that in a predetermined contour are mutually engageable with one another when the tire is deflated under load;

stabilizing means interposed between the bead portions of said sidewalls for preventing inadvertent axial displacement of said bead portions of said sidewalls relative to one another and said hub when the tire is deflated under load,

said stabilizing means bridging said bead portions of said sidewalls and cooperating therewith to provide for an axially stable unit that serves to minimize axial displacement of said radially outer portions of said sidewalls relative thereto and lateral oscillation of the tire when it is deflated under load and run flat,

each of said sidewalls having an annular recess formed therein, said recesses extending axially and radially outward from the bead regions of the tire;

a rigid annulus;

a first annular flange extending from one side of said annulus; and

a second annular flange extending from the second side of said annulus,

one surface of each of said first and second flanges being contoured to conform to the first and second beads, respectively, of said tire and to substantially conform to the annular recesses formed in the first and second sidewalls, respectively, of said tire only upon deflation of said tire.

4,059,139

TIRE FINISHING APPARATUS

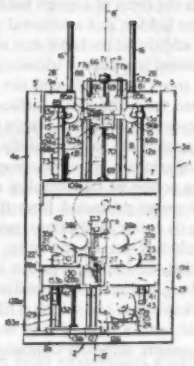
Kichinosuke Nishimoto, Higashimurayama, and Seiichiro Nishimura, Shakujii, both of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

Filed Mar. 30, 1976, Ser. No. 671,813

Claims priority, application Japan, Apr. 4, 1975, 50-41539; May 22, 1975, 50-61276; June 10, 1975, 50-69959

Int. Cl.[2] B29H *17/40*

U.S. Cl. 157—13 **15 Claims**



1. A tire finishing apparatus for trimming and removing spews formed on the outer peripheral wall of a cured time during a vulcanizing process, comprising:

a tire holding mechanism including at least three rollers adapted to be in contact with the outer peripheral wall of said tire with its rotational axis substantially horizontal to prevent said tire from being vibrated during rotation thereof;

a tire rotating mechanism driving at least one of said rollers of said tire holding mechansim to rotate said tire about its rotational axis while being held by said tire holding mechanism;

a stationary frame structure;

a movable frame structure vertically movably mounted on said stationary frame structure;

a driving mechanism for vertically moving said movable frame structure;

an additional movable frame structure disposed below said movable frame structure and vertically movably mounted on said stationary frame structure;

an additional driving mechanism for vertically moving said additional movable frame structure; and

a spew trimming cutter mechanism comprising a tread spew trimming cutter arrangement disposed opposite the tread surface of said tire, said tread spew trimming cutter arrangement including a rockable arm having one end pivotally connected to and supported by said stationary frame structure, a trimming cutter holder rotatably mounted on the other end of said rockable arm, a tread spew trimming cutter substantially in the form of a comb held by said

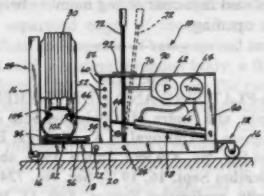
trimming cutter holder, and actuator means mounted on said stationary frame structure to cause said rockable arm to be swung about its one end so that said tread spew trimming cutter is contactable with the tread surface of said tire for trimming said spews projected from the tread surface of said tire, an additional tread spew trimming cutter arrangement disposed opposite the tread surface of said tire, said additional tread spew trimming cutter arrangement including a movable bracket mounted on the underside of said movable frame structure to be movable in a direction substantially parallel to the rotational axis of said tire, a bracket moving device including an air cylinder, mounted on said movable frame structure, including a piston rod pivotally connected to said movable bracket for moving said movable bracket in a direction substantially parallel to the rotational axis of said tire and which is filled with an incompressible liquid, an additional rockable arm located beneath said movable frame structure and having one end pivotally connected to and supported by said movable bracket, an additional trimming cutter holder rotatably mounted on the other end of said additional rockable arm, an additional tread spew trimming cutter substantially in the form of a comb held by said additional trimming cutter holder, and additional actuator means for swinging said additional rockable arm about its one end so that said additional tread spew trimming cutter is contactable with the tread surface of said tire for trimming said spews projected from the tread surface of said tire upon downward movement of said movable frame structure by said driving mechanism and is axially moved along the tread surface of said tire upon movement of said movable bracket by the action of said bracket moving device for trimming said spews projected from the tread surface of said tire along its entire axial extent, said additional actuator means including an air cylinder, mounted on said movable bracket, including a piston rod pivotally connected to a longitudinally intermediate portion of said additional rockable arm and which is filled with an incompressible liquid, and a pair of side wall spew trimming cutter arrangements disposed opposite and spaced from each other, each of said side wall spew trimming cutter arrangements including a further additional rockable arm having a longitudinally intermediate portion pivotally connected to and supported by said additional movable frame structure, a further additional trimming cutter holder pivotally mounted on one end of said further additional rockable arm by a pivotal pin substantially parallel to the equatorial plane of said tire, a side wall spew trimming cutter substantially in the form of a comb held by said further additional trimming cutter holder, and further additional actuator means for swinging said further additional rockable arm about its intermediate portion so that said side wall spew trimming cutter is contactable with the side wall surface of said tire for trimming said spews projected from the side wall surface of said tire and is radially moved along the side wall surface of said tire upon vertical movement of said additional movable frame structure by the action of said additional driving mechanism for trimming said spews projected from the side wall of said tire along its entire radial extent, said further additional actuator means including an air cylinder, pivotally mounted on said additional movable frame structure, including a piston rod pivotally connected to the other end of said further additional rockable arm and which is filled with an incompressible liquid, said tread spew trimming cutter, said additional tread spew trimming cutter and said side wall spew trimming cutter each including a number of sharp point edges and a stepped portion formed on the reverse side of said trimming cutter rearwardly of said sharp point edges so as to produce a small gap between said sharp point edges and said tread surface of said tire.

4,059,140

TIRE CHANGING MACHINE

Jarvis D. Sedgwick, Coon Rapids, Iowa, assignor to James Sumrall, Bay Spring, Miss.

Filed Dec. 15, 1975, Ser. No. 640,632
Int. Cl.[2] B60C *25/08*
U.S. Cl. 157—1.17 **5 Claims**



1. A tire changing machine comprising,
a T-shaped frame including a standard and a cross member and said standard having a pair of telescopically extendable portions,
ground-engaging casters at opposite ends of said cross member and at the free end of said standard,
an upstanding tire engaging post at the free end of said standard,
a tire support cradle on one of said telescopic standard portions adjacent said post, said cradle extending parallel to said cross member and having rollers at opposite ends,
a hydraulic cylinder pivotally connected to said other telescopic frame portion and positioned to extend at an angle to the horizontal;
and a bead-engaging tool on the outer free end of said cylinder for engaging the bead of a tire on said cradle support,
a second upstanding post, said second post being on said other telescopic frame portion adjacent said tire support cradle, and
adjustment support means on said second post for selectively vertically pivotally adjusting said cylinder in the desired angular position, said adjustment means including said second upstanding post having a pair of spaced apart plate members, said tool extending between said plate members and a bolt means being selectively vertically positioned between said plate members to support said tool to allow the tool to freely pivot upwardly relative to the bolt means as the tool moves along the curvature of the tire.

4,059,141

INTRUSION BARRIER AND GUIDE FOR SLIDING WINDOWS, DOORS AND THE LIKE

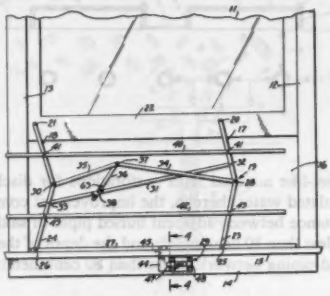
James L. Hutton, P.O. Box 1282, Victorville, Calif. 92392

Filed Oct. 12, 1976, Ser. No. 731,856
Int. Cl.[2] E06B *9/01*
U.S. Cl. 160—90 **2 Claims**

1. A device for association with a closure member,
said closure member being slideable across an opening in a frame, comprising
a cross member on the side of said opening opposite said closure member,
a first pair of spaced parallel links pivotally connected at ones of their ends to said closure member,
a second pair of spaced parallel links pivotally connected at ones of their ends to said cross member, one of said parallel links of
the links of said first pair being pivotally connected at their opposite ends to the opposite ends of respective ones of the links of said second pair, and
enforcing means for enforcing parallel swinging movement of the parallel links of each of the pairs upon sliding movement of said closure member, said enforcing means comprising:
a cross link pivotally connected between one of said paral-

lel links of one of said pairs and one of said parallel links of the other of said pairs,

a pair of equalizer links pivotally connected together at ones of their ends and pivotally connected at the opposite ends thereof to respective ones of said opposite ends of said links of said first and second pairs, and



a third equalizer link pivotally connected at one end to said cross link and pivotally connected at the opposite end thereof to the pivotal connection between said pair of equalizer links.

4,059,142

CONTINUOUS CASTING OF A METALLIC PRODUCT BY ELECTROMAGNETIC CENTRIFUGING

Robert Alberny; Jean Pierre Birat, both of Metz, and Roger Ventavoli, Algrange, all of France, assignors to Institut de Recherches de la Siderurgie Francaise (IRSID), St. Germain-en-Laye, France

Filed Jan. 18, 1977, Ser. No. 760,428
Claims priority, application France, Jan. 20, 1976, 76.01347
Int. Cl.² B22D *11/10, 27/02*
U.S. Cl. 164—49 **7 Claims**

1. In a process of continuously casting a metallic product by electromagnetic centrifuging, wherein a liquid metal is injected into a cooled ingot mold having an axis, the metal is rotated by applying thereto a magnetic field turning about the axis of the mold, the magnetic field being produced by a polyphase inductor placed in the immediate proximity of the cast product, and the metal is extracted from the mold in partially solidified condition, the step of obtaining a maximal stirring intensity of the liquid metal in the mold by

a. rotating the magnetic field at a frequency of rotation of 4 to 15 Hertz,

b. using a copper alloy of structural rigidity for the mold wall, and

c. keeping the thickness of the mold wall below a value calculated by the formula

$$\frac{\log\left(\frac{d-2e}{d}\right)}{1-\left(\frac{d-2e}{d}\right)^2} = \frac{0.6 \times Re \times \lambda(1-\mu)}{E\,\alpha\,\phi} - \frac{1}{2}$$

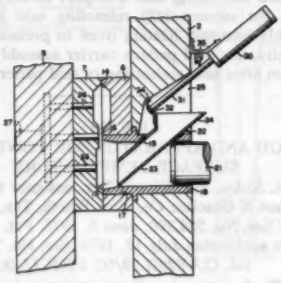
wherein e = the thickness of the wall;
d = the diameter of the mold;
α = linear expansion coefficient,
λ = thermal conductivity in cal/cm/sec. ° C,
E = Young's modulus in kg/mm²,
μ = Poisson's coefficient and
Re = elastic limit in kg/mm² of the wall material; and
Φ = thermal flux at the level of the meniscus in cal/cm²/sec.

4,059,143

METHOD OF AND A MEANS FOR POURING MOLTEN METAL IN A DIE CASTING DEVICE

Akiyoshi Morita; Tamio Hayasaka; Kunio Shimizu, and Tokiharu Fukuda, all of Toyota, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Dec. 22, 1975, Ser. No. 643,168
Claims priority, application Japan, Sept. 3, 1975, 50-106705
Int. Cl.² B22D *17/30*
U.S. Cl. 164—113 **14 Claims**



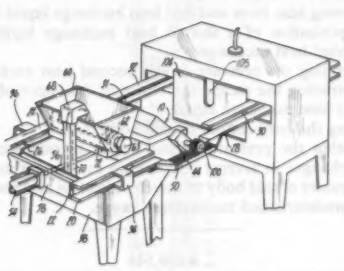
1. A method for pouring molten metal in a die casting device wherein a shot sleeve for supplying molten metal to a die cast mold is substantially horizontally disposed in the die casting device, comprising the steps of obliquely inserting an inclined guide means into said shot sleeve through an opening provided in a top portion of said shot sleeve to the extent that the lower outlet end of said guide means contacts a bottom portion of said shot sleeve, and pouring molten metal along said guide means toward the inside of said shot sleeve as a quiet flow.

4,059,144

APPARATUS FOR FORMING SHELL MOLDS

Delbert Eugene Esche, 34446 Marquette, Westland, Mich. 48185

Filed Sept. 24, 1976, Ser. No. 726,176
Int. Cl.² B22D *11/08*
U.S. Cl. 164—166 **21 Claims**



1. Apparatus for forming molded shapes such as shell molds including:

a pattern;

a pattern carrier assembly including means for supporting said pattern;

a molding mix dispensing station including means for dispensing a quantity of molding mix;

a heat oven;

a discharge station intermediate said dispensing station and said heating oven and also including means for inverting said pattern at said discharge station to discharge excess molding mix from said pattern, said means inverting said

pattern including means rotatably mounting said pattern relative to said pattern carrier assembly;

transport means including means for advancing said pattern carrier assembly from an initial position at said mix dispensing station so that said pattern receives said quantity of molding mix dispensed at said dispensing station, through a position at said discharge station, said transport means including (A) means rotating said pattern therein by said transport means advancing said carrier assembly from said initial position through said discharge station to a position within said heating oven to cure said mold, and advanced thence to a position beyond said heating oven for mold unloading, said transport means also including means for subsequently retracting said pattern carrier assembly into said heating oven to preheat said pattern, and retracting said pattern carrier assembly to the initial position after said preheating of said pattern.

4,059,145

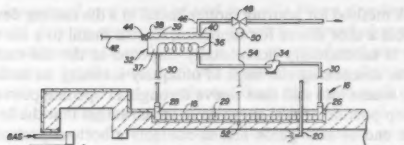
METHOD AND APPARATUS FOR CONTROLLING SURFACE TEMPERATURE

Theodore A. Ruble, Fort Worth, Tex., assignor to Sid Richardson Carbon & Gasoline Co., Fort Worth, Tex.

Division of Ser. No. 584,190, June 5, 1975, Pat. No. 3,982,586. This application July 15, 1976, Ser. No. 705,463

Int. Cl.² F25B *29/00*; F28F *27/00*

U.S. Cl. 165—1 **2 Claims**



1. A method for automatically controlling the temperature of a body while removing heat therefrom comprising:

removing heat from said body with a first heat exchange liquid circulating between a first heat exchanger in contact with said body and a second heat exchanger spaced from said body;

removing heat from said first heat exchange liquid by partial vaporization of a second heat exchange liquid in said second heat exchanger;

controlling the pressure in said second heat exchanger by restricting the escape therefrom of the vapor of said second heat exchange liquid;

sensing the temperature of said body; and

adjusting the pressure of said vapor in said second heat exchanger in inverse relationship to changes in the temperature of said body to thereby maintain said body within a predetermined temperature range.

4,059,146

HEATING SYSTEM WITH A THERMAL PUMP

Emil Grüniger, Altendorf, Switzerland, assignor to IDC Chemie AG, Rapperswil, Switzerland

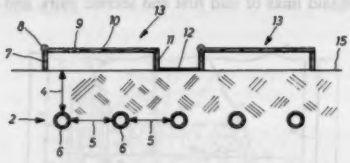
Filed Nov. 26, 1975, Ser. No. 635,356

Claims priority, application Switzerland, Nov. 28, 1974, 15818/74

Int. Cl.² B22C *7/00*; F25B *27/02*; F25D *23/12*; F24J *3/02*

U.S. Cl. 165—45 **3 Claims**

1. In a heating system with a thermal pump, including an evaporator section consisting of a piping network buried in the ground, a compressor for compressing the evaporated working fluid, a condensing section operating as heating plant, and a translucent screen for shielding the ground against the atmosphere, such that a heat storage of the heat radiated from the sun and penetrated through the screen is provided and the space defined between the ground surface and the screen forms an insulation against heat loss to the atmosphere, said screen



being a sheet-like material with perforations for discharging any accumulated water thereon, the improvement comprising that the distance between adjacent buried pipes of said piping network is less than 80 centimeters and the depth of the buried pipes of said piping network is less than 80 centimeters.

4,059,147

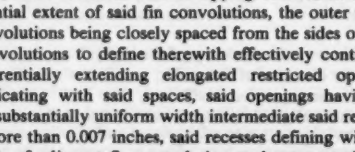
INTEGRAL FINNED TUBE FOR SUBMERGED BOILING APPLICATIONS HAVING SPECIAL O.D. AND/OR I.D. ENHANCEMENT

John K. Thorne, Decatur, Ala., assignor to Universal Oil Products Company, Des Plaines, Ill.

Continuation-in-part of Ser. No. 271,835, July 14, 1972, abandoned. This application Jan. 9, 1974, Ser. No. 432,042

Int. Cl.² F28F *13/18*, *1/42*, *1/36*, *1/26*

U.S. Cl. 165—133 **9 Claims**



1. Heat transfer tubing modified for the enhancement of heat transfer to liquid in contact with the exterior surface thereof in submerged boiling applications, said tubing having a multiplicity of helically extending axially spaced fin convolutions extending around said tubing, said tubing having a continuous cylindrical wall, said fin convolutions having inner base portions extending generally radially outwardly from said wall and having outer portions inclined towards the side of the adjacent convolutions to define therewith partially enclosed spaces of substantially uniform cross-section extending around the tubing, the transverse dimensions of said fin convolutions measured from the base to the tips thereof being substantially uniform except for a plurality of uniformly circumferentially spaced recesses extending inwardly from the tips of said convolutions, said recesses in total occupying 10–30% of the circumferential extent of said fin convolutions, the outer tips of said convolutions being closely spaced from the sides of adjacent convolutions to define therewith effectively continuous circumferentially extending elongated restricted openings communicating with said spaces, said openings having an average substantially uniform width intermediate said recesses of not more than 0.007 inches, said recesses defining with the side walls of adjacent fin convolutions enlargements in said continuous openings having a width at least 50% greater than the average width of opening intermediate said enlargements.

4,059,148

PRESSURE-COMPENSATED DUAL MARINE RISER

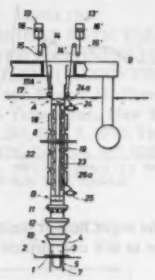
Everhard C. Blomsma, Rijswijk, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Filed Oct. 18, 1976, Ser. No. 733,553

Claims priority, application United Kingdom, Dec. 30, 1975, 53144/75

Int. Cl.² E21B 7/12

U.S. Cl. 166—.5 13 Claims



1. Marine riser system for use in offshore well drilling operations, said system comprising two risers that are adapted to be vertically arranged with a substantially annular space therebetween, each riser consisting of a plurality of sections that are sealingly interconnected in end-to-end relationship, the outer riser comprising connecting means at the lower end thereof, said connecting means being adapted for connecting and sealing the lower end of the outer riser to a wellhead, said outer riser further comprising supporting means near the upper end thereof, said supporting means being adapted for being connected to a heave compensator system carried by a floating drilling means, sealing means being arranged for sealing off the annular space at, at least, the lower end thereof, and closeable fluid pressure equalizing means arranged in the wall of the outer riser, said means being adapted for equalizing the fluid pressures prevailing in the annular space and in the space outside the outer riser.

4,059,149

SELF-OPERATING CHEMICAL FEEDER FOR AN OIL WELL

Robert J. Harrison, Hominy, Okla., assignor to Texaco Inc., New York, N.Y.

Filed Oct. 18, 1976, Ser. No. 733,660

Int. Cl.² E21B 43/00

U.S. Cl. 166—64 21 Claims

1. A self-operating chemical feeder for an oil well having a tube with a casing therearound forming an annulus in the well comprising,

a. pump means on a chemical feeder housing for pumping a chemical into an injection line for passing down into the well,

b. first valve means on said injection line for ejecting a slug of said chemical into the injection line and well,

c. first timer means for controlling said first valve means,

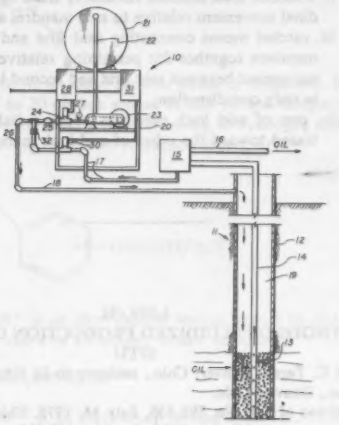
d. flush line means for supplying a high pressure flush liquid to said injection line for circulating said chemical throughout the well,

e. second valve means for controlling the flow of said flush liquid in said injection line,

f. second timer means for controlling said second valve means,

g. said first valve means being responsive to said first timer means for being opened for a predetermined period of time for ejecting a precise slug of said chemical to said injection line for delivery to the well, and

h. said second valve means being responsive to said second timer means for supplying a predetermined slug of flush



liquid to said injection line for circulating said chemical slug throughout the well for insuring well treatment on a regular basis as scheduled and for eliminating personnel time required for manually flushing slugs of the chemical throughout the well for an extended period of time.

4,059,150

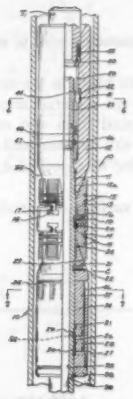
ANCHORING ASSEMBLY

Phillip H. Manderscheid, Cypress, Tex., assignor to Brown Oil Tools, Inc., Houston, Tex.

Filed Feb. 9, 1976, Ser. No. 656,093

Int. Cl.² E21B 33/129

U.S. Cl. 166—120 34 Claims



1. An anchoring assembly for use in a well conduit comprising:

a. a longitudinally extending mandrel assembly;

b. laterally movable gripping means carried by said mandrel assembly for lateral movement into anchoring engagement with said well conduit;

c. setting means carried by said mandrel assembly and movable relative to said gripping means for moving said gripping means into anchoring engagement with said well conduit;

d. locking means for retaining said gripping means in an-

choring engagement with said well conduit, said locking means including:

i. a first lock member movable longitudinally relative to said mandrel assembly;

ii. a second lock member releasably fixed against longitudinal movement relative to said mandrel assembly; and

iii. ratchet means connecting said first and second lock members together for permitting relative longitudinal movement between said first and second lock members in only one direction;

iv. one of said lock members being radially resiliently biased toward the other of said lock members.

4,059,151

METHODS OF FLUIDIZED PRODUCTION OF COAL IN SITU

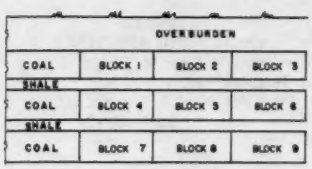
Ruel C. Terry, Denver, Colo., assignor to In Situ Technology, Inc., Denver, Colo.

Division of Ser. No. 595,335, July 14, 1975. This application Mar. 4, 1976, Ser. No. 663,708

The portion of the term of this patent subsequent to Apr. 6, 1993, has been disclaimed.

Int. Cl.[2] E21B *43/22, 43/24*

U.S. Cl. 166—258 **3 Claims**



2. A method of producing coal in situ comprising the steps of:

gasifying in situ one block in the coal formation,

introducing a solvent material into a second block in the formation separated from said one block to liquefy the second block in situ wherein said second block has previously been gasified then cooled-down by the introduction of water, and

recovering at the surface the products of gasification and liquefaction.

4,059,152

THERMAL RECOVERY METHOD

Joseph C. Allen, Bellaire, and Yick-Mow Shum, Houston, both of Tex., assignors to Texaco Inc., New York, N.Y.

Division of Ser. No. 508,378, Sept. 23, 1974, Pat. No. 3,991,828. This application July 30, 1976, Ser. No. 710,077

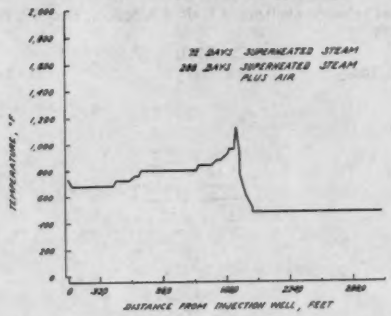
Int. Cl.[2] E21B *43/24*

U.S. Cl. 166—261 **4 Claims**

1. A method for recovering hydrocarbons such as low gravity crude oil or bitumen from a subterranean reservoir penetrated by at least one injection well and one production well comprising:

a. initiating an in situ combustion operation in the reservoir by injecting air into the injection well,

b. following the air with super heated steam and



c. following the super heated steam with air and water so as to initiate an in situ combustion front in the reservoir.

4,059,153

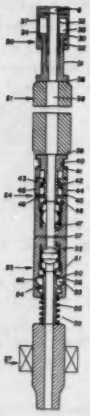
WEIGHT AND PRESSURE OPERATED WELL TESTING APPARATUS AND ITS METHOD OF OPERATION

George J. Nix, London, England; Burchus Q. Barrington; David L. Farley, both of Duncan, Okla., and Norman G. Hortman, Laurel, Miss., assignors to Halliburton Company, Duncan, Okla.

Division of Ser. No. 595,648, July 14, 1975. This application Dec. 2, 1976, Ser. No. 746,913

Int. Cl.[2] E21B *43/12*

U.S. Cl. 166—264 **4 Claims**



1. In the testing of an underground formation intersected by a fluid filled well bore extending from the earth's surface to the formation, wherein the formulation is tested with a testing string having a flow passage therethrough, a normally closed valve in the lower portion of the testing string for opening and closing the flow passage, and a weight and pressure responsive valve located in the testing string adjacent said normally closed valve for closing the flow passage responsive to weight and opening the flow passage responsive to pressure, a method comprising the steps of:

lowering the testing string into the well bore to the formation depth;

isolating the formation from the fluid pressure in the well bore above the formation;

applying weight to the weight and pressure responsive valve, thereby closing the flow passage adjacent said normally closed valve;

opening the normally closed valve subsequent to the closing of said weight and pressure responsive valve; and,

increasing the fluid pressure in the well bore above the formation, thereby opening said weight and pressure responsive valve to provide fluid communication between the surface and the formation.

4,059,154

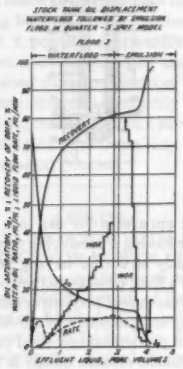
MICELLAR DISPERSIONS WITH TOLERANCE FOR EXTREME WATER HARDNESS FOR USE IN PETROLEUM RECOVERY

William B. Braden, Jr., and Kenoth H. Flourny, both of Houston, Tex., assignors to Texaco Inc., New York, N.Y.

Division of Ser. No. 421,296, Dec. 3, 1973. This application May 24, 1976, Ser. No. 657,808

Int. Cl.[2] E21B *43/22*

U.S. Cl. 166—274 8 Claims

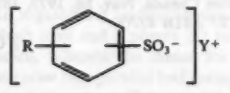


1. A process for recovering petroleum from a subterranean reservoir wherein a first fluid is driven through the reservoir from an injection well to a production well by a second fluid where petroleum is produced the first fluid comprising a hydrocarbon, an aqueous fluid containing from about 1500 to 12,000 parts per million ions of calcium and/or magnesium and a surfactant system wherein the surfactant system comprises

a first anionic surfactant having one of the following general formulas:

$$R-SO_3^-Y^+$$

wherein R is an alkyl radical, linear or branched, having from 5 to 25 carbon atoms, and Y is a monovalent cation such as sodium, potassium or ammonium; or



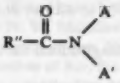
wherein R and Y have the same meaning as above and

a second anionic surfactant having the following general formula:

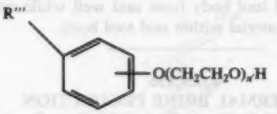
$$[R'-(OCH_2CH_2)_n-SO_4]^-Y^+$$

wherein R' is an alkyl or alkylaryl radical, linear or branched, having from 7 to 20 carbon atoms, n is an integer from 1 to 10 and Y is a monovalent cation such as sodium, potassium or ammonium and

a nonionic surfactant having one of the following structures:



wherein R'' is an alkyl radical, linear or branched, having from 5 to 20 carbon atoms, A and A' are independently selected from the group consisting of hydrogen and alkanols having from 1 to 10 carbon atoms; or



wherein R''' is an alkyl radical having from 5 to 20 carbon atoms, and n' is an integer from 6 to 20 or

$$R''''\ O(CH_2CH_2O)_{n''}-H$$

wherein R'''' is an alkyl chain having from 5 to 20 carbon atoms and n'' is an integer from 6 to 20.

4,059,155

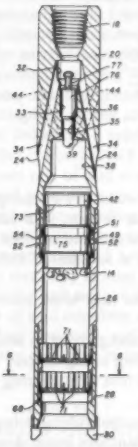
JUNK BASKET AND METHOD OF REMOVING FOREIGN MATERIAL FROM A WELL

Tom R. Greer, Houston, Tex., assignor to International Enterprises, Inc., Houston, Tex.

Filed July 19, 1976, Ser. No. 706,387

Int. Cl.[2] E21B *31/06, 31/08*

U.S. Cl. 166—301 27 Claims



4. A junk basket comprising:

a tool body having a longitudinally extending passageway therethrough and a system of flowways therein for providing reverse circulation of fluid through said tool body;

a magnet assembly disposed in said passageway;

retainer means cooperative between said magnet assembly and said tool body to retain said magnet assembly in a lower position in said passageway and selectively releasable to permit longitudinal movement of said magnet assembly to an upper position in said passageway.

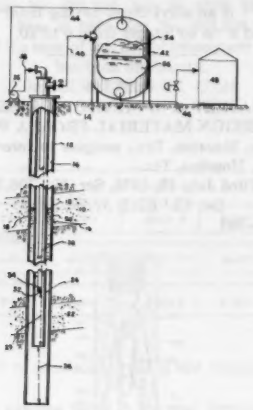
16. A method of removing foreign material from a well including the steps of:

a. lowering a tubular tool body having a magnet assembly therein into said well to the site of said foreign material;
b. retaining said magnet assembly in a lower position adjacent the lower end of said tool body to attract at least a portion of said foreign material;
c. releasing said magnet assembly for longitudinal movement within said tool body;
d. moving said magnet assembly upwardly within said tool body to an upper position while moving said foreign material into said tool body beneath said magnet assembly by circulating fluid downwardly along the exterior of said tool body and upwardly within said tool body adjacent the lower end of said tool body;
e. removing said tool body from said well while retaining said foreign material within said tool body.

4,059,156
GEOTHERMAL BRINE PRODUCTION

Clyde H. Berg, 3655 E. Ocean Blvd., 2-H, Long Beach, Calif. 90803

Filed Apr. 29, 1976, Ser. No. 681,565
Int. Cl.[2] E21C *43/28*
U.S. Cl. 166—314 11 Claims



1. A method for the recovery of energy from a high temperature geothermal brine present in a subterranean interval at superatmospheric pressure and subject to deposition of calcium carbonate upon a substantial reduction of its pressure which comprises:

forming a column of said brine extending a depth to said interval;

positioning a first tubing string in said column of said brine and a second tubing string therein terminating above the lower end of said first tubing string and in fluid communication therewith;

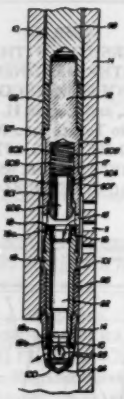
injecting into said second tubing string a lift fluid immiscible with and of substantially lesser density than said brine to discharge from said second into said first tubing string and form an intimate admixture with said brine having a density sufficiently less than the density of said brine whereby said column of brine surrounding said first tubing string exerts a sufficient hydrostatic head on said mixture to lift said mixture to the surface through said first tubing string; and

withdrawing said mixture of brine and lift fluid from said first tubing string while maintaining the mixture under superatmospheric pressure sufficient to prevent the release of gases therefrom and thereby preventing the precipitation of calcium carbonate scale within said tubing string.

4,059,157
WELL CONTROL VALVE APPARATUS

Talmadge L. Crowe, Houston, Tex., assignor to Baker International Corporation, Orange, Calif.

Continuation-in-part of Ser. No. 652,483, Jan. 26, 1976. This application Aug. 23, 1976, Ser. No. 716,431
Int. Cl.[2] E21B *43/00*
U.S. Cl. 166—317 34 Claims

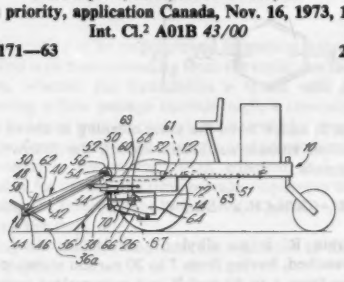


1. Control valve apparatus for use in a tubular string disposed in a well bore having a producing formation: comprising a metallic valve body structure having an inlet opening, an outlet opening, and a fluid passage between said openings, first metallic closure means in said body structure to one side of said inlet opening closing and passage and movable to open position when subjected to a predetermined fluid pressure in said inlet opening, second metallic closure means in said body structure to one side of said outlet opening and spaced from said first closure means to provide a confined portion of said passage between said first and second closure means into which fluid internally and externally of the tubing string cannot enter, said first and second closure means being fixed to said body structure by fluid impervious means forming metal seals therewith, subjecting said first closure means to said predetermined fluid pressure effecting opening of said confined portion of said passage to permit said fluid pressure to enter said confined portion and shift said second closure means to open position permitting fluid flow through said inlet opening, confined portion, and outlet opening.

4,059,158
ROCK AND ROOT PICKER

Clifford A. Ranger, R.R. No. 1, Lloydminster, Alberta, Canada

Filed Apr. 3, 1974, Ser. No. 457,653
Claims priority, application Canada, Nov. 16, 1973, 185971
Int. Cl.[2] A01B *43/00*
U.S. Cl. 171—63 2 Claims



1. A rock picker comprising:

a. a mobile vehicle;
b. a fork scoop-like table swingably mounted on said vehicle and projecting forwardly therefrom to skim rocks from a surface on which said vehicle is supported and collect the rocks on such table when said vehicle is moving in a forward direction over said surface;
c. power means connected to said table to swing the same from a rock collecting position to a raised rock dumping position;
d. a reel mounted on said vehicle and located at a position forwardly of the leading end of said fork scoop-like table, said reel being mounted for movement in a vertical plane to raise and lower the same and journalled for rotation about an axis transverse to the direction of travel of said vehicle, said reel having a plurality of individual fingers projecting outwardly from said axis at positions spaced circumferentially around and longitudinally therealong;
e. power means drivingly connected to said reel for rotating the same so as to sweep said fingers rearwardly over said surface to individually engage rocks on said surface and roll said rocks rearwardly onto said fork table;
f. a rock receiving bucket pivotally mounted on said vehicle and located at a position rearwardly of the scoop-like table to receive rocks discharged therefrom when said table is in its raised dumping position; and
g. means interconnecting said swingably mounted table and bucket for moving the latter from a normal rock receiving position to a dumping position in response to swinging of said table to its raised position.

4,059,159

AGRICULTURAL TRACTOR WITH DRAFT LOAD SENSING SPRINGS FOR POWER LIFT CONTROL

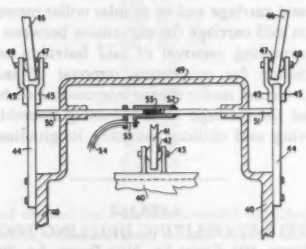
Stephen Moorhouse; Harry Horsfall, both of Huddersfield, and Alan Rangeley Dean, Brighouse, all of England, assignors to David Brown Tractors Limited, Huddersfield, England

Filed Sept. 22, 1975, Ser. No. 615,298

Claims priority, application United Kingdom, Oct. 2, 1974, 42671/74

Int. Cl.² A01B *63/112*

U.S. Cl. 172—7 **11 Claims**



1. An agricultural tractor having means for sensing implement draft load and a power lift mechanism controllable by said means, wherein the means for sensing implement draft load comprise two parallel leaf springs which are spaced apart in a lateral direction relative to the tractor, said spring being rigidly anchored at their spaced apart front ends to the frame of the tractor and having flexible portions adapted to flex in said direction, two connector means each of which is fixed to the rear end of one of the springs, two hitch links each of which is connected to one of the connector means, the arrangement being such that a draft load applied to a link causes flexing of the associated spring in said direction, and means for transmitting to the power lift mechanism a signal derived from any variation in the distance between the flexible portions of the springs.

4,059,160

ROTARY HARROWS

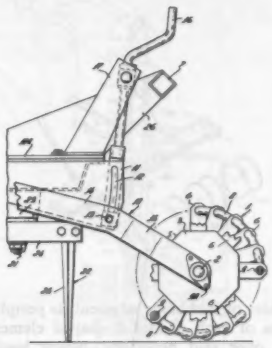
Ary van der Lely, Maasland, and Cornelis Johannes Gerardus Bom, Rozenburg, both of Netherlands, assignors to C. van der Lely N. V., Maasland, Netherlands

Division of Ser. No. 394,279, Sept. 4, 1973, which is a continuation of Ser. No. 208,698, Dec. 16, 1971, abandoned. This application May 29, 1975, Ser. No. 581,855

Claims priority, application Netherlands, Dec. 18, 1970, 7018468

Int. Cl.² A01B *49/06*

U.S. Cl. 172—47 **7 Claims**



1. A rotary harrow having a transverse frame and a plurality of rotatable soil working members, said soil working members being supported on shafts journalled in said transverse frame and rotatable about upwardly extending axes defined by said shafts, said soil working members comprising downwardly extending tines and drive means being connected to rotate said members, a roller connected to said frame and being rotatable about a substantially horizontal axis extending transverse to the direction of travel of the harrow, said roller having a periphery comprised by helical ground-engaging rods and being located at the rear of said frame, coupling means on the front side of said frame and said coupling means comprising connecting points for a multi-point linkage of a prime mover, arms pivotally interconnecting the roller to said frame and adjusting means associating at least one of said arms with said frame to adjust the position of said roller with respect to said frame, said coupling means and said roller affording the main support for the harrow during operation, an elongated tool bar being fixed to said frame by arm means and said tool bar being interconnected to said coupling means by at least on strut bar, said tool bar extending horizontally and across the working width of said harrow at the rear of said members and above said roller, said arm means extending upwardly and rearwardly from the frame with respect to the direction of travel.

4,059,161

TILLAGE APPARATUS AND IMPROVED BLADE THEREFOR

Edward M. Smith; James H. Casada, and Timothy H. Taylor, all of Lexington, Ky., assignors to Deere & Company, Moline, Ill.

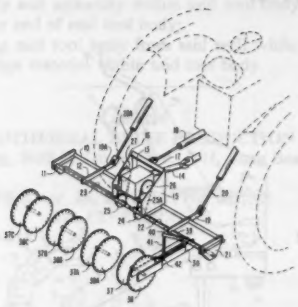
Continuation of Ser. No. 427,912, Dec. 26, 1973, abandoned. This application Aug. 26, 1975, Ser. No. 607,801

Int. Cl.² A01B *35/16*

U.S. Cl. 172—60 **9 Claims**

1. A tillage apparatus for use with a towing vehicle for cutting a plurality of continuous narrow spaced furrows, comprising an elongated transverse tool bar supporting a transverse drive shaft, said tool bar being attachable to said vehicle and supporting a power means connected to said drive shaft, a plurality of tillage unit assemblies detachably mounted side by side on said drive shaft, each of said assemblies comprising an

arm pivotally journalled at one end upon said transverse drive shaft and carrying a rotatable short transverse shaft at its other end, at least one tillage blade affixed to said short transverse shaft and rotatable therewith, each said tillage blade constituting a generally planar disc-like plate in substantial alignment with the direction of towing and having a generally circular cutting periphery with a plurality of substantially U-shaped circumferentially-spaced furrow-opening wear-resisting metallic elements astraddle said periphery, the two leg portions of each of said U-shaped elements being permanently affixed to



respective sides of said blade adjacent its periphery, with the bight portion of each of said U-shaped elements extending transversely over said periphery, means biasing said arm downwardly to bring said blade into cutting contact with the ground and independently of the biasing of adjacent assemblies, and blade driving means interconnecting said drive shaft and said short shaft and providing for rotation of said blade upon actuation of said power means, whereby each said tillage blade cuts a continuous discreet narrow furrow as the apparatus is towed over the ground.

4,059,162

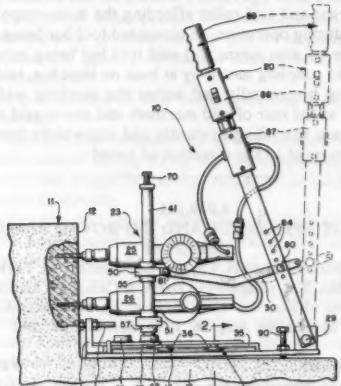
DRILLING UNIT FOR STADIUM SEATS

James Zbinden, and George W. Ries, both of Sterling, Ill., assignors to Lawrence Brothers, Inc., Sterling, Ill.

Filed June 14, 1976, Ser. No. 696,047

Int. Cl.[2] E21C *9/00*

U.S. Cl. 173—37 **17 Claims**



1. A device for drilling a plurality of holes in a vertical face such as a stadium step riser, comprising, in combination, a base plate, drill mounting means including a movable foot plate, guide means interconnecting the base plate and foot plate to permit the foot plate to be slid over the base plate toward and away from the vertical face along a predetermined path, at least one upright standard, standard mounting means on the foot plate permitting the upright standard to be selectively affixed to and detached from the foot plate, a platform carried by the upright standard for linear vertical motion thereupon, means for affixing the platform relative to the standard in any one of a vertical range of positions, and means carried on the platform for selectively affixing to the platform a drill motor and carried drill, and lever means connected to the drill mounting means for urging the drill mounting means along the base plate toward the vertical face.

4,059,163

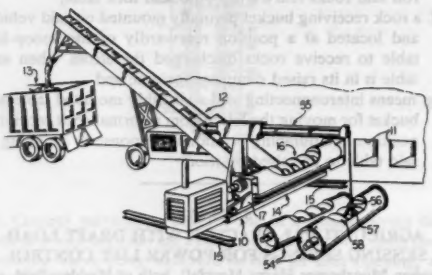
MINE DRILLING APPARATUS AND METHOD

Robert N. Stedman, Chillicothe, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Aug. 16, 1976, Ser. No. 714,423

Int. Cl.[2] E21C *25/58*

U.S. Cl. 175—73 **23 Claims**



1. A drilling apparatus comprising a support, an auger assembly including a carriage mounted on said support for longitudinal movements thereon, a rotatable auger, first motor means for selectively rotating said auger, a cutting edge disposed adjacent to a forward end of said auger to cooperate therewith for drilling purposes, a tubular shroud disposed around said auger, a plurality of circumferentially disposed fastening means releasably connecting a rearward end of said shroud to said carriage and an annular collar means adjustably mounted on said carriage for movement between a first position for permitting removal of said fastening means and a second position for preventing removal of said fastening means, and second motor means interconnected between said support and the carriage of said drilling assembly for selectively moving said drilling assembly longitudinally on said support.

4,059,164

SELF-STABILIZING DRILLING TOOL

Ralph J. Farris, 601 Edwin St., New Iberia, La. 70560

Filed May 19, 1976, Ser. No. 687,737

Int. Cl.[2] E21B *41/00, 17/10*

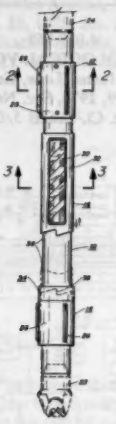
U.S. Cl. 175—73 **1 Claim**

1. A self-stabilizing drilling tool, having a tool body and fixed blade assemblies vertically spaced apart and rigidly secured to said tool body, for connecting in a vertically rotational drill string lubricated with pressure drill mud when drilling a vertical well bore, comprising in combination:

a. a hub mounted for rotation and vertical linear movement on said tool body and intermediate said fixed blade assemblies vertically spaced apart; and

b. a plurality of diagonal blades, parallelly positioned to define a single vertical row thereof, fixed to and projecting radially from said hub for vertically lifting and randomly rotating said hub on said tool body, by means of said pressure mud, with said single row of parallel diago-

nal blades just clearing sides defining said vertical well bore, whereby any deviation from vertical by said drill



string engages said row of diagonal blades with a near side of said well bore and pry said drill string back to vertical.

4,059,165

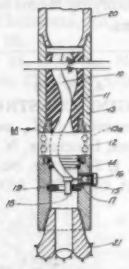
VERSATILE FLUID MOTOR AND PUMP

Wallace Clark, 1830 S. German Church Road, Indianapolis, Ind. 46239

Continuation-in-part of Ser. No. 638,639, Dec. 8, 1975, Pat. No. 4,051,910. This application July 14, 1976, Ser. No. 705,043

Int. Cl.[2] E21B *3/12*

U.S. Cl. 175—107 **37 Claims**



1. First and second fluid motors coupled together in generally axial tandem relation, each of said motors comprising a helical gear pair including an inner member having one or more external helical threads, a cooperating outer member having one or more internal helical threads, the number of helical threads on said inner and outer members differing by one and a swivel having relatively rotatable sections;

a. the outer member of each of said gear pairs being fixed in a tubular casing secured to one of the sections of their associated swivel;

b. means associated with the end of the inner member of each of said gear pairs and with the other section of their associated swivel to prevent contrary rotation whle permitting gyration with oscillation of said inner member relative to said outer member;

c. the helical gear pair of said first motor having left-hand threads, and the tubular casing of said first motor being threaded onto the end of a string of drill pipe;

d. said first motor having its inner member connected to the inner member of said second motor, the helical gear pair of said second motor having right-hand threads; and

e. a drill bit secured to the tubular casing of said lower motor.

4,059,166

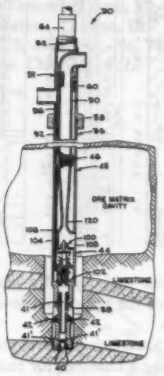
SUBTERRANEAN DRILLING AND SLURRY MINING

Philip R. Bunnelle, Santa Clara, Calif., assignor to FMC Corporation, San Jose, Calif.

Filed July 12, 1976, Ser. No. 704,278

Int. Cl.[2] E21C *37/12*

U.S. Cl. 175—232 **42 Claims**



1. In a drilling and mining apparatus for slurry mining of granular ore from a deep well cavity, the combination comprising: a tool string in said well cavity; flow inducing means for directing a liquid into said tool string at variable system pressures and capacities which vary between relatively low drilling conditions and relatively high mining conditions; a mining nozzle included in and extending transversely of said tool string and including a mining nozzle cylinder and resilient means tending to maintain the mining nozzle in a closed position; an eductor pump section in said tool string including an eductor nozzle provided with an eductor nozzle cylinder and resilient means tending to maintain said eductor nozzle closed; and a foot valve in said eductor pump section operable independently of said eductor nozzle and including resilient means tending to hold said foot valve open; first hydraulic control means cooperating with said foot valve resilient means for maintaining said foot valve open in response to said system pressure and capacity being at drilling conditions, and for closing the foot valve in response to said system pressure and capacity being between drilling conditions and mining conditions; and second hydraulic control means for moving said mining nozzle and said eductor nozzle between closed and open positions.

4,059,167

HYDRAULIC FISHING JAR HAVING TANDEM PISTON ARRANGEMENT

William O. Berryman, Houston, Tex., assignor to Baker International Corporation, Orange, Calif.

Filed Feb. 4, 1977, Ser. No. 765,766

Int. Cl.[2] E21B *1/10*

U.S. Cl. 175—297 **17 Claims**

6. In a hydraulic fishing jar adapted to be run into a well on a fishing string and connected to a fishing tool in the well bore:

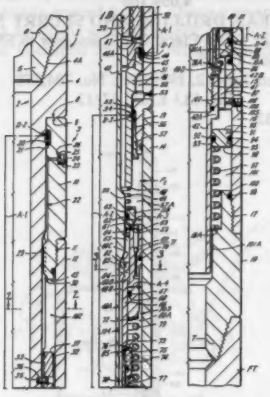
a. Inner and outer telescopically interengaged bodies;

b. A plurality of diametrically defined pressure areas, each of said areas having upper and lower sealed ends;

c. Tandem piston means immediate one of said upper and lower sealed ends of each of said pressure areas;

d. Seal means carried by one of said inner and outer interengagable bodies and engagable by the other of said inner and outer interengagable bodies and defining one of the upper and lower sealed ends of said pressure areas; and

e. Seal means between said piston means and one of said



inner and outer telescopically interengaged bodies and defining one of the upper and lower sealed ends of said pressure ends.

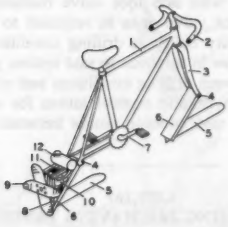
said fluid pressure areas being in fluid communication with one another and defining a chamber for receipt of lubricant therewithin.

4,059,168

RUNNER ATTACHMENT FOR BICYCLES WITH A REACTION THRUST DEVICE

Herbert Douglas House, 3111 Edgewood Drive, Wonder Lake, Ill. 60097

Filed Feb. 4, 1976, Ser. No. 655,281
Int. Cl.[2] B62D *57/04*
U.S. Cl. 180—1 P **1 Claim**



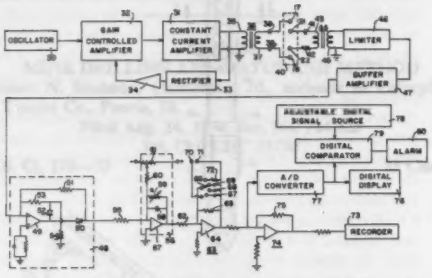
1. In a runner attachment for bicycles having front and rear axles; a runner having a "T" shape in lateral cross section comprised of longitudinally extending angle members, a link attached to the runner to incline from the rear of the runner to a point located directly above midspan of the runner at which point are mounted bearings for attachment to the front and rear bicycle axles, a self-contained reaction thrust device, support member means attached to the inclined link for supporting the reaction thrust device so as to act toward the rear.

4,059,169

MONITOR FOR BIOLOGICAL VOLUME CHANGES

Winston H. Hagen, 36 Husted Lane, Greenwich, Conn. 06830

Filed Feb. 9, 1976, Ser. No. 656,399
Int. Cl.[2] A61B *5/02*
U.S. Cl. 128—2.05 V **12 Claims**



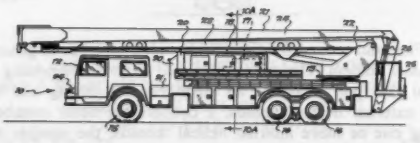
1. In a monitor for measuring biological volume changes having means for applying constant A.C. current in a biological volume of a subject, receiver means including means for sensing voltage across said biological volume resulting from said A.C. current, means for rectifying said sensed voltage, display means, and means for applying said rectified voltage to said diplay means to display a value representing the electrical impedance of said biological volume, the improvement wherein said means for applying said rectified voltage to said display means comprises filter means for inhibiting variations of said displayed value due to respiration and movement of said subject, said filter means having a time constant between 2 seconds and 15 minutes, said filter means comprising substantially the only signal modifying means between said rectifying means and display means.

4,059,170

FIRE ENGINE CONSTRUCTION

Richard E. Young, Lancaster, N.Y., assignor to Young Fire Equipment Corporation, Lancaster, N.Y.

Filed Apr. 1, 1976, Ser. No. 672,777
Int. Cl.[2] B60K *1/00*
U.S. Cl. 180—54 R **16 Claims**



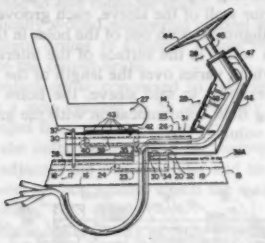
1. A boom-carrying vehicle such as a fire engine or the like comprising an elongated chassis for mounting a boom and having front and rear ends, a cab mounted proximate said front end, a turntable mounted proximate said rear end, a boom mounted on said turntable, front wheel means secured to said chassis proximate said front end, rear wheel means secured to said chassis proximate said rear end, an engine mounted on said chassis between said cab and said rear wheels, drive means coupled between said engine and said rear wheels, said elongated chassis between said turntable and an area between said engine and said cab being formed of a plurality of joined box sections extending lengthwise of said chassis to provide high rigidity to said chassis against twisting.

4,059,171

REVERSIBLE SEAT AND STEERING CONSOLE FOR TRACTORS

Daniel Pakosh, 261 Knowles Avenue, Winnipeg, Canada

Filed Dec. 23, 1975, Ser. No. 643,680
Claims priority, application Canada, June 17, 1975, 229569
Int. Cl.[2] B60N 1/08, 1/02
U.S. Cl. 180—77 S 6 Claims



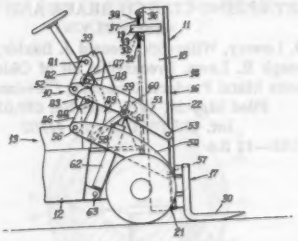
1. In a tractor which includes a frame a source of power in the frame and a cab on the frame behind the source of power and a hitch connection at the rear of the frame; a one-piece seat and steering console, means to mount said console on said frame for rotation from a forwardly facing position to a rearwardly facing position and vice versa, means to detachably lock said console in either of the aforesaid positions, means to move said console forwardly and rearwardly on said frame and to detachably lock said console in any one of a plurality of positions, said means to detachably lock said console in the forwardly or rearwardly facing position also detachably locking said console in any one of said plurality of positions forwardly and rearwardly of said frame and means to adjust the fore and aft position of the seat portion of said console relative to the steering portion of said console.

4,059,172

LIFT TRUCK MAST POSITIONING MECHANISM

Robert N. Stedman, Chillicothe, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed July 16, 1976, Ser. No. 705,846
Int. Cl.[2] B66F 9/06
U.S. Cl. 187—9 E 12 Claims



1. A mast positioning mechanism in combination with a lift truck of the type having a longitudinally extending main frame and a mounting tower secured to and extending upwardly from a forward end of the main frame, comprising:

an upwardly extending mast disposed adjacent the forward ends of the main frame;

means for pivotally connecting the mast to the mounting tower and for pivotally moving the mast between a lowered position and a raised position, said means including

a pair of longitudinally extending, vertically spaced parallel arms having their forward ends pivotally connected to the mast, and

a pair of sector gear means rotatably mounted on the mounting tower in spaced relation and individually pivotally connected to the rearward ends of the arms;

gear means rotatably mounted to the mounting tower in meshing engagement with both of the sector gear means and including a crank arm extending therefrom;

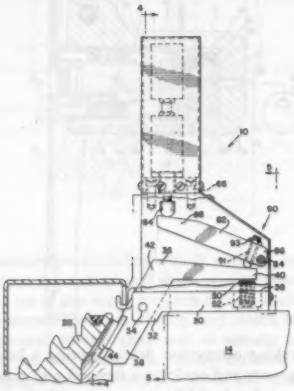
a guide link having one end pivotally connected to the distal end of the crank arm and its other end pivotally connected to one arm of the pair of arms.

4,059,173

AUTOMATIC BRAKE MECHANISM FOR MILLING MACHINES

Thomas F. Specht, Arlington Heights; Juergen W. Trodler, Wheaton, and Pavel Vanecek, Lyons, all of Ill., assignors to Union Special Corporation, Chicago, Ill.

Filed Dec. 9, 1976, Ser. No. 749,146
Int. Cl.[2] B60T 7/12
U.S. Cl. 188—110 4 Claims



1. An automatic brake mechanism for a milling machine having a motor means and a drive pulley means driven thereby for rotating a tool, operator controlled switch means shiftable between an on position whereby energizing said motor means and an off position whereby de-energizing said motor means, said brake mechanism comprising:

a rotatably mounted member means having a first end portion means closely adjacent said pulley means, a second end portion means remote from said pulley means, and a medial portion means therebetween, said medial portion means serving to rotatably mount said member means to said milling machine;

a generally planar friction brake element means secured to the first end portion means of said member means;

means operable when actuated to rotate said member means to bring said friction brake element means into frictional braking engagement with said drive pulley means;

solenoid valve means having a constant supply of fluid under pressure thereto, said solenoid valve means being connected to and controlled by said operator controlled switch means, one position of said controlled switch means de-energizing said solenoid valve means to allow said fluid under pressure to actuate said operable means and the other position of said controlled switch means energizing said solenoid valve means to remove said fluid under pressure from said operable means and to de-actuate said operable means whereby engagement of said brake element means with said drive pulley means is responsive to the position of said operator controlled switch means; and

means for biasing the first end portion means of said member means away from said drive pulley means upon energization of said motor means and said solenoid valve means

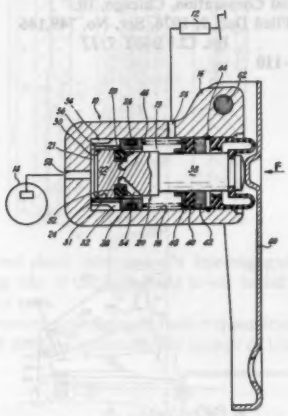
whereby removing the frictional braking element means from drive pulley means, said biasing means constantly applying a force against said member means independent of the action of said solenoid valve means.

4,059,174

BRAKING CORRECTION DEVICE

Jean-Jacques Carré, Montreuil, France, assignor to Societe Anonyme D.B.A., Paris, France

Filed Feb. 7, 1977, Ser. No. 766,322
Claims priority, application France, Feb. 18, 1976, 76.04422
Int. Cl.² B60T 8/18
U.S. Cl. 188—195 **2 Claims**



1. In a braking correction device having a housing which movably supports and encloses a stepped piston in a bore, the piston having a head which cooperates with the housing bore to substantially define an inlet chamber and an outlet chamber and the piston head carrying an elastomeric member which opens communication between the inlet chamber and the outlet chamber when the piston is in an idle position and closes communication between the inlet chamber and the outlet chamber when the piston is moved from its idle position, the improvement wherein said piston head is slidably disposed within a sleeve and a ring adjacent thereto, said sleeve being porous and disposed within the housing bore to adjoin the outlet chamber, said ring being disposed within the housing bore in fluid tight relation therewith and adjoining the inlet chamber, said sleeve and said ring being formed as elements separate from each other and said bore the elastomeric member cooperating with the porous sleeve to communicate the inlet chamber with the outlet chamber via the porous sleeve in the idle position and engaging the ring to close communication between the inlet chamber and the outlet chamber when the elastomeric member is moved with the head away from the idle position.

4,059,175

LINEAR FORCE SHOCK ABSORBER

Richard G. Dressell, Jr., 14609 Stonehouse, Livonia, Mich. 48154, and Robert J. Heideman, 37780 Westwood Circle, Apt. 101, Westland, Mich. 48185

Continuation-in-part of Ser. No. 574,885, May 6, 1975, abandoned. This application Apr. 28, 1976, Ser. No. 681,287
Int. Cl.² F16F 9/48
U.S. Cl. 188—285 **8 Claims**

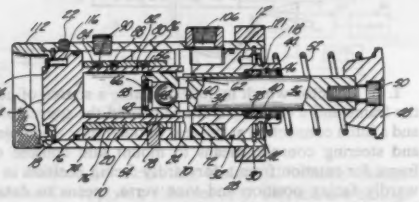
1. A device for absorbing the kinetic energy of a moving member so as to decelerate the member, comprising:

a tubular cylinder having a plurality of holes formed in its wall which are spaced relative to one another along the longitudinal axis of the cylinder;

a piston slidable within the cylinder;

a sleeve having an interior wall surrounding the cylinder and having a number of holes formed in it equal to the number of holes formed through the cylinder and spaced relative to one another longitudinally along the length of the sleeve at the same spacing as the holes in the cylinder, and further having a plurality of annular grooves formed in the interior wall of the sleeve, each groove being in substantial alignment with one of the holes in the sleeve, and, having a width at the surface of the interior wall of the sleeve which varies over the length of the groove;

a volume exterior to said sleeve, the holes in said sleeve providing fluid communication with the grooves and the exterior volume;



means for positioning the sleeve over the cylinder so that the grooves overlie the holes in the cylinder and a fluid orifice is formed by the interface of each of the holes in the cylinder and a respective overlying surface of the overlying groove;

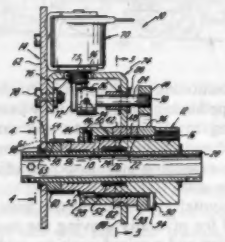
each of the grooves being of such configuration that at any point along the length of the groove, the cross-sectional area of the groove is greater than the area of the fluid orifice formable by the interface of the hole and groove at that point, where the area of the orifice so formed is a function of the rotational position of the sleeve relative to the cylinder, whereby said grooves are at relatively low pressure relative to the pressure in said cylinder to thereby minimize leakage flow between said cylinder and said sleeve.

4,059,176

UNITARY SPRING CLUTCH BRAKE AND ACTUATOR ASSEMBLY

Robert D. Lowery, Willowick; Donald J. Baxter, South Euclid, and Joseph R. Lawn, Brecksville, all of Ohio, assignors to Marquette Metal Products Company, Cleveland, Ohio

Filed May 24, 1976, Ser. No. 689,035
Int. Cl.² F16D 67/02, 41/02
U.S. Cl. 192—12 BA **4 Claims**



1. A unitary spring clutch and actuator assembly comprising

a. an actuator subassembly having

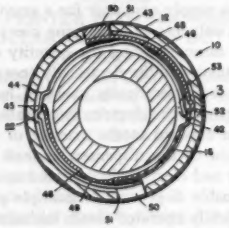
a-1. a frame;
a-2. a power actuator means including a movable stop member mounted on said frame;
a-3. said frame having a first and second opening therein;
b. a spring clutch subassembly having
b-1. a rotatable shaft;
b-2. input and output drums mounted for rotation about the axis of said shaft and with one of said drums being connected to said rotatable shaft;
b-3. a helically wound mainspring coaxial with said input and output drums to transmit torque from the input drum to the output drum;
b-4. a control collar connected to said mainspring and having a stop element to be selectively engaged and disengaged from said stop member;
b-5. a brake collar surrounding the mainspring and disposed adjacent the control collar and having an inner peripheral surface against which the mainspring bears for braking;
b-6. said brake collar having an outer peripheral surface of irregular contour;
b-7. said second opening having a peripheral contour complementary to said peripheral brake surface and of a size to slidably receive said brake collar therein and hold the latter against rotation;
b-8. said shaft having a portion thereof extending axially beyond the end of at least one of the drums and receivable in said first opening in the frame; and
c. detachable retaining means coacting with said shaft and the frame for securing the spring clutch subassembly to the frame and thus provide a unitary assembly.

4,059,177

BAND CLUTCH ASSEMBLY

Ernest U. Lang, Niles, Mich., assignor to National-Standard Company, Niles, Mich.

Filed June 17, 1976, Ser. No. 697,020
Int. Cl.² F16D *41/20*
U.S. Cl. 192—41 S **4 Claims**



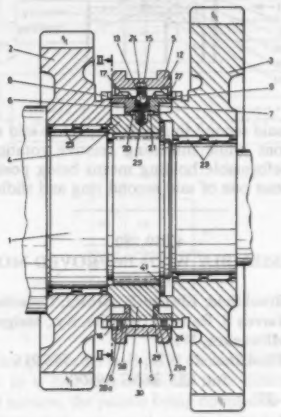
1. A clutch band for an overrunning band clutch assembly having an inner clutch member coaxially disposed with respect to an outer clutch member and band clutch engaging means for transmitting a torque between the inner and outer clutch members, said clutch band having an unbalanced condition tending to cause said band to shift eccentrically during overrunning of said band clutch, and restricting means associated with said clutch band for direct contact with the adjacent clutch member limiting eccentric movement of said clutch band.

4,059,178

GEAR-SHIFTING JAW CLUTCH FOR SPEED-CHANGING VEHICULAR TRANSMISSION

Alfred Magg, Tettnang, and Günther Thurau, Friedrichshafen, both of Germany, assignors to Zahnradfabrik Friedrichshafen Aktiengesellschaft, Friedrichshafen, Germany

Filed July 16, 1976, Ser. No. 705,814
Int. Cl.² F16D *23/06*
U.S. Cl. 192—53 F **10 Claims**



1. In a transmission including a shaft, a rotary member freely rotatable about the axis of said shaft, said member being provided with a set of jaw teeth, a clutch on said shaft operable to couple said member with said shaft, said clutch having a central body secured to said shaft and an annular tooth carrier nonrotatable on said body but axially shiftable thereon for selective engagement with said jaw teeth, and actuating means for so shifting said tooth carrier,

the improvement wherein said clutch is provided with a blocking ring coaxial with said tooth carrier and interposed between the latter and said member, said blocking ring being carried on said body with freedom of limited relative angular displacement by frictional contact with said member between two extreme positions in which said blocking ring prevents engagement of said tooth carrier with said jaw teeth, said blocking ring being frictionally entrainable by said member into a nonblocking intermediate angular position facilitating said engagement upon a passage of said member and said body through a condition of synchronous rotation; said tooth carrier being provided with radially movable weight means mounted for co-operation with coacting formations on said blocking ring, at shaft speeds less than a predetermined limit beyond which said weight means is centrifugally moved out of alignment with said coacting formations, to rotate said blocking ring into said intermediate position.

4,059,179

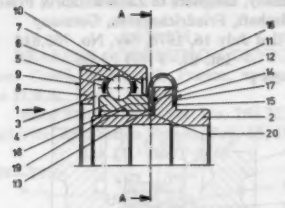
SELF-CENTERING CLUTCH BEARING

Horst Manfred Ernst, Eltinghausen; Armin Olschewski, Schweinfurt; Rainer Schlirger, Schwanfeld; Lothar Walter, Schweinfurt; Manfred Brandenstein, Aschfeld, and Erich Burkl, Stammheim, all of Germany, assignors to SKF Industrial Trading and Development Company B.V., Nieuwegein, Netherlands

Filed Oct. 29, 1975, Ser. No. 626,647
Claims priority, application Germany, Dec. 6, 1974, 2457682
Int. Cl.² F16D *23/14*
U.S. Cl. 192—98 **7 Claims**

1. In a clutch bearing assembly having a bearing with first and second rings defining races for rolling bearing elements, a

sliding sleeve, and means coupling said sliding sleeve to said second ring, the improvement wherein said coupling means comprises permanently deformable holding means intercoupling said second ring and sliding sleeve for permitting displacement of said second ring with respect to said sleeve in all radial directions while inhibiting relative rotation therebetween, said deformable holding means being positively connected to at least one of said second ring and sliding sleeve.



4,059,180

ROLLER ASSEMBLY WITH IMPROVED MOUNTING MEANS

Bert Krivec, Brookfield; Elwood B. Brown, Cedarburg, both of Wis., and Warren S. Raynor, Danville, Ky., assignors to Rexnord Inc., Milwaukee, Wis.

Filed Dec. 2, 1976, Ser. No. 746,916
Int. Cl.[2] B65G *39/00*
U.S. Cl. 193—37 **4 Claims**

1. In combination, a roller conveyor apparatus having an improved mounting means for attaching the rollers to support structures comprising:

a. Spaced support structures having a non-circular support shaft holes;

b. a plurality of spaced rollers positioned between the support structures;

c. hub means attached to and associated with each roller end for providing a hub about which each roller can rotate, each hub means having a shaft opening having a non-circular cross-section along at least a first portion adjacent said support structures;

d. mounting means associated with each hub means for supporting each hub to adjacent support structure comprising:

1. an elongated tubular member of elastomeric material having a head end and a body portion which extends through said shaft hole, said body portion having a plurality of essentially longitudinal slots extending from the remote end thereof into said shaft opening and a plurality of inwardly and outwardly extending knobs between the longitudinal slots, said body portion having an outside diameter sufficiently large to provide for a flattening of the outer surface against the flat walls of said shaft hole and first portion of said shaft opening when said tubular member is inserted into the shaft opening; and

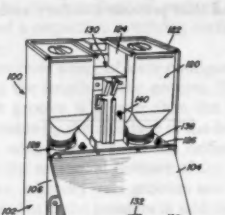
2. a pin means member of elastomeric material having a head portion and a shank portion which extends through said support hole and said tubular member, said shank portion having a groove which when the pin means is fully inserted is adapted to accept the inwardly extending knobs and is constrained against longitudinal movement relative to the tubular member by virtue of said knobs, said groove having a depth less than the length of said inwardly extending knobs to cause the walls of the tubular member abut the hub means along points around the remote end of said shaft opening thereby providing support to said hub means over substantially the entire inserted length of said tubular member.

4,059,181

MEAL-SERVICE POWDERED FOODS DISPENSER

Irving E. Greenfield, Jr., and Ronald C. Jacobson, both of Miami, Fla., assignors to Food Systems, Inc., Miami, Fla.

Continuation of Ser. No. 498,243, Aug. 16, 1974, abandoned. This application Jan. 5, 1976, Ser. No. 646,554
Int. Cl.[2] G07F *13/06*
U.S. Cl. 194—13 **10 Claims**



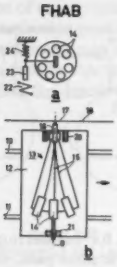
1. A powdered foods dispenser comprising a supply container for powdered food product, electrically operated means dispensing a quantity of powdered food product from the container, said electrically operated means being oriented at the bottom of the supply container for a gravity discharge of the food product only into an underlying user receptacle without mixing, and means varying the quantity of product discharged upon actuation of the electrically operated means, said supply container and electrically operated means being disposed in a cabinet with the electrically operated means including a pushbutton exposed to the exterior of the cabinet for enabling operation of the dispenser, at least one additional supply container and electrically operated means disposed in the cabinet to enable dispensing of multiple powdered foods with each electrically operated means including a pushbutton disposed exteriorly of the cabinet, said means for varying the quantity of product dispensed including an adjustable timer forming part of the electrically operated means for varying the time of operation thereof, said supply container being in the form of a canister removably mounted in said cabinet, said canister having a closure member at the upper end thereof for enabling refilling of the canister, said canister including an upper edge having outwardly projecting flange means thereon supported on the upper cabinet edges to prevent spillage of powdered foods in the interior of the cabinet.

4,059,182

MOSAIC PRINTER

Lars Ake Olof Gustafsson, and Carl-Otto Ulin, both of Jarfalla, Sweden, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 535,134, Dec. 20, 1974, abandoned. This application July 7, 1976, Ser. No. 703,177
Claims priority, application Sweden, Dec. 20, 1973, 73172017
Int. Cl.[2] B41J 3/04
U.S. Cl. 197—1 R 4 Claims



1. A mosaic printer which comprises a printing head mounted for movement along a first rectilinear line proximate to an associated printing sheet to produce a plurality of signs arrayed in a second rectilinear line parallel to said first rectilinear line, said printing head being provided with a number of printing wires, each of said wires including means which upon preselected axial travel produce a printing mark on the associated printing sheet, a plurality of said marks producing said signs said wires extending from a first part of said printing head in the vicinity of the associated printing sheet substantially along a third rectilinear line, said third rectilinear line and said second rectilinear line having an included angle, at least said first part of said printing head being rotatable about an axis which is substantially perpendicular to the associated printing sheet, and a setting mechanism to position said first part of said printing head to at least two discrete angular positions, in which said third rectilinear line is disposed at different included angles with respect to said first and second rectilinear lines for producing signs with different heights and inclination by said setting mechanism before printing any individual sign and without change of said elements, said included angles being less than 100 degrees and said included angle not varying during the printing of any one sign.

4,059,183

DOT MATRIX PRINTER WITH SLANTED PRINT HEAD AND MODULAR SKEWING OF DOT PATTERN INFORMATION

Phillip Keith Hoskins, San Jose, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 30, 1976, Ser. No. 755,867
Int. Cl.[2] B41J 3/04
U.S. Cl. 197—1 R 22 Claims

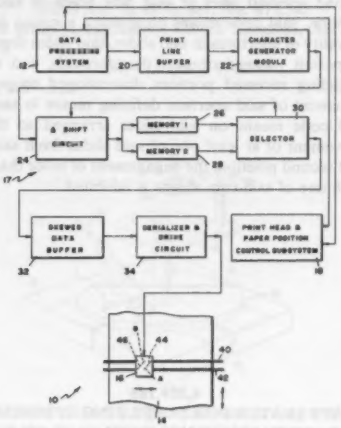
1. A printing system comprising:

a source of data to be printed;

a character generator module storing dot pattern information defining a plurality of characters to be printed;

addressing circuitry responsive to data from the source and coupled to obtain from the character generator, a sequence of information bytes forming a dot pattern module which defines a dot pattern for a portion less than the whole of a character to be printed, each printed character being defined by a plurality of dot pattern modules;

a skewing circuit coupled to receive from the character generator module sequences of dot pattern bytes and to skew the information of each sequence to produce a skewed dot pattern compensating for a skew of a print head to permit desired character formats to be printed by the print head, the skewing circuit operating on each dot pattern module in a repetitive pattern; and



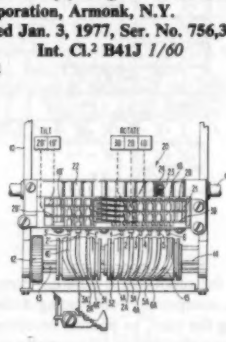
a dot matrix printer having print elements that are skewed relative to a line perpendicular to a direction of print element motion, the printer being coupled to print character defining dot patterns in response to information received from the skewing circuit.

4,059,184

SINGLE PRINT ELEMENT SELECTION APPARATUS WITH MULTIPLE SELECTION INHIBITING MEANS

Robert Caldwell Redding, Versailles, and Joe Larry Vaughan, Lexington, both of Ky., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 3, 1977, Ser. No. 756,308
Int. Cl.[2] B41J 1/60
U.S. Cl. 197—18 10 Claims



5. A selection apparatus for a printer of the single element type, having a single print element carried by a print carrier, comprising:

a cam and cam follower, a plurality of cam means on said cam to effect different axial motion of said cam and thus said follower upon engagement of said cam means with a selection pin;

a plurality of selection pins each selectively engageable with one of said cam means to impart said predetermined differing axial motion of the cam upon engagement of selected ones of said pins with an associated cam means and upon rotation of said cylinder;

pin selection means to effect propulsion of each of said pins into engagement with an associated cam means;

pin motion inhibiting means comprising a plurality of slides, and electromagnet engageable with each of said slides,

each slide being movable between first and second positions and having code means thereon for engaging first selected ones of said pins when in said first position, and second selected ones of said pins when in said second position, said code means comprising a means defining a plurality of apertures in said slides, said slides dimensioned to permit passage of pins therethrough, and said pins including recessed portions dimensioned to permit engagement of said aperture defining means in said recess, said code means on said slides arranged so that upon movement of at least one of said slides from said first to said second position, the engagement of more than one pin with one of said cam means is inhibited.

4,059,185

APPARATUS FOR SUPPLYING SPINNING PREPARATORY MACHINES WITH CANS OR THE LIKE

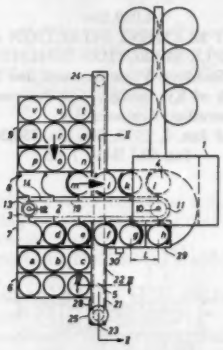
Kurt Weber, Elgg, Switzerland, assignor to Rieter Machine Works, Ltd., Winterthur, Switzerland

Filed Dec. 8, 1975, Ser. No. 638,922

Claims priority, application Switzerland, Dec. 24, 1974, 17268/74

Int. Cl.² B23Q 7/00

U.S. Cl. 198—339 **4 Claims**



1. Apparatus for supplying a spinning preparatory machine with sliver cans, comprising transporting dollies for supporting and transporting the cans, an endless revolving can transporting means having a plurality of substantially equally spaced can entrainment members for engaging empty silver can disposed upon the transporting dollies, for urging said empty cans from said transporting dollies, for moving said empty cans into said spinning preparatory machine and for moving said empty cans into said spinning preparatory machine and for moving full sliver cans from said spinning preparatory machine back onto one of said transporting dollies, means for stepwise driving said can transporting means along a path of travel, dolly shifting means arranged transversely of and beneath the path of travel of the can transporting means for successively individually engaging ones of said transporting dollies, moving said transporting dollies to said can transporting means, across the path of travel thereof and into a position for receiving said full sliver cans from said spinning preparatory machine and means for driving said dolly shifting means in coordinated sequence with the movement of said can transporting means.

4,059,186

CAN BODY SHAPER

Anton A. Aschberger, Oak Lawn; Jack L. Avery, Park Forest; William J. Cartwright, Palos Park; Geoffrey J. Dean, Rockton; Oliver J. Tysver, Chicago Heights; Robert W. Wolfe, Oak Lawn, and Frederick H. Bautz, Hazel Crest, all of Ill., assignors to The Continental Group, Inc., New York, N.Y.

Division of Ser. No. 221,587, Jan. 28, 1972, Pat. No. 3,807,209.

This application Sept. 25, 1973, Ser. No. 400,499

Int. Cl.² B65G 47/00

U.S. Cl. 198—481 **2 Claims**

1. A transfer device for transferring members to and from supports moving in an arcuate path, said transfer device comprising a turret member mounted for rotation about a fixed axis, a plurality of article carriers pivotally carried by said turret member for movement therewith in a generally circular path, and control means for controlling the contour of a portion of said generally circular path to correspond to the contour of said arcuate path, said control means including a fixed cam, spring loaded control arms connected to said articles carriers for positioning the same, cam follower means carried by said control arms riding on said cam to position said arms, control arms of opposite ones of said article carriers being interconnected by a connector, and said connectors being disposed in crossing relation and slidably mounted in said turret.

4,059,187

APPARATUS FOR TRANSFERRING AT A PREDETERMINED SPACING ON TO A RECEPTION CONVEYOR OBJECTS FED AT AN IRREGULAR SPACING FROM A DELIVERY CONVEYOR

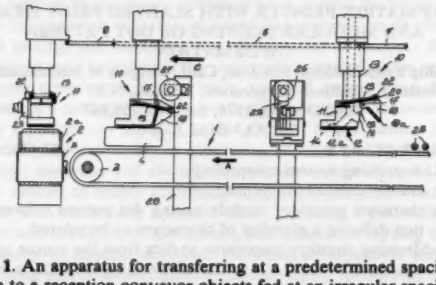
Herbert Richard Rueff, Via Anna Frank, 10, Croce di Casalecchio (Bologna), and Franco Aiuola, Via Ranzani, 17, Bologna, both of Italy

Filed Oct. 12, 1976, Ser. No. 731,487

Claims priority, application Italy, Dec. 19, 1975, 3625/75.

Int. Cl.² B65G 47/04

U.S. Cl. 198—461 **6 Claims**



1. An apparatus for transferring at a predetermined spacing on to a reception conveyor objects fed at an irregular spacing from a delivery conveyor driven with continuous motion, consisting of a transfer conveyor which moves with continuous motion and at a speed different from that of the delivery conveyor from the delivery conveyor to the reception conveyor and comprises a first portion parallel to the delivery conveyor and a second portion parallel to the reception conveyor, object take-up suckers disposed at regular distances

apart on the transfer conveyor for transferring the objects from the delivery conveyor and for depositing them at regular distances on the reception conveyor, and at least one sensor stationarily disposed in front of the first portion of the transfer conveyor and sensing the position of the objects on the delivery conveyor, characterized in that a valve is associated with each sucker and arranged to assume two stable positions relative thereto, namely a position of activation and a position of deactivation of the sucker, at least two control devices disposed in a fixed position along the first portion of the transfer conveyor and which by means of a selective control by the sensor assume a position of engagement with the sucker valves to move them into the activation position, and a further control device disposed in a fixed position on the second portion of the transfer conveyor such as to be able to engage with the sucker valves to move them into the deactivation position.

4,059,188

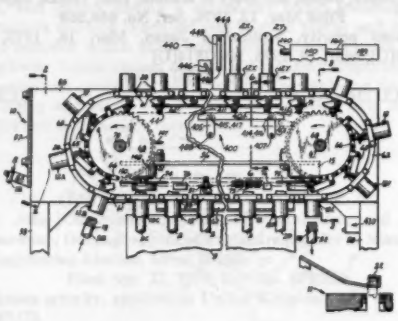
MANUAL PREFORM REMOVAL DEVICE

David Ian McDonald, Cincinnati, Ohio, assignor to Cincinnati Milacron Inc., Cincinnati, Ohio

Continuation-in-part of Ser. No. 668,323, March 18, 1976. This application June 21, 1976, Ser. No. 697,861

Int. Cl.[2] B65G *15/00*

U.S. Cl. 198—477 6 Claims



1. In combination with an endless conveyor for carrying in a coupling an elongated workpiece with its axis substantially normal to the direction of conveying from a loading station to an unloading station and return, the coupling having follower actuated means to grasp the workpiece which means is normally biased to a workpiece engaging condition and upon movement of the follower is actuated to a nongrasping condition by a follower motion substantially parallel to said workpiece axis thereby to release a workpiece therein or to receive a workpiece, the improvement for selectively removing on the return run of the conveyor a workpiece that has been accidentally retained in the coupling at said unloading station comprising:

means for engaging said follower on the return run before the coupling arrives at said loading station responsive to which engagement the follower is moved to a non-grasping condition and includes a four bar linkage having a cam track mounted on a pair of crank arms one at each end of said track, said cam track being movable by said means for moving into and out of engagement with said coupling follower; and

means to selectively move said means for engaging into and out of engagement with said follower.

4,059,189

CLASSIFICATION OF PARTICLES

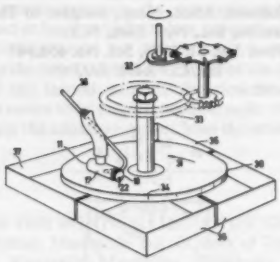
Ronald John, High Wycombe, England, assignor to Vacu-Blast Limited, Slough, England

Filed Apr. 1, 1976, Ser. No. 672,743

Claims priority, application United Kingdom, Apr. 3, 1975, 13734/75

Int. Cl.[2] B07C *9/00*

U.S. Cl. 209—112 20 Claims



1. A method of classifying particles according to their sphericity which comprises placing the particles on an upper region of a smooth surface which rotates about a vertical axis and slopes downwardly from said axis, and introducing a cyclic component into the rotation of said surface effecting shaking of the particles in a circumferential direction parallel to said surface, whereby the particles are carried along on said surface in said circumferential direction and simultaneously migrate radially down the slope at rates dependent on the sphericity of the individual particles, the particles which have migrated leaving said surface respectively at different positions spaced in said direction, at least one of said positions being at a lower region of the surface.

4,059,190

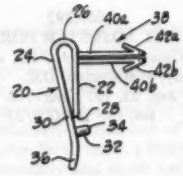
CLIP FOR DISPENSING ADVERTISING LITERATURE

Gerald A. Conway, Cleveland Heights, Ohio, assignor to Gerald Conway & Co., Inc., Cleveland, Ohio

Filed July 8, 1976, Ser. No. 703,469

Int. Cl.[2] A47F *7/00*

U.S. Cl. 211—57.1 5 Claims



1. A one-piece, card-supporting clip adapted for use with an upright support having a clip-engageable edge comprising

front and rear downwardly extending legs;

a loop portion having a diameter approximately the same as or greater than the thickness of the support clip-engageable edge connecting said legs, the loop portion resiliently biasing the front leg so that it converges on the rear leg to become at its free end contiguous with the rear leg whereby the legs are adapted to press against opposite sides of said support adjacent the clip-engageable edge;

means projecting forwardly from the front leg to support a plurality of cards;

said rear leg being longer than the front leg and having a lower rear leg free end which curves rearwardly from the

plane of the leg, the legs being essentially straight except for the rear leg curved free end, said rear leg free end terminating in approximately the same plane as the front leg; and

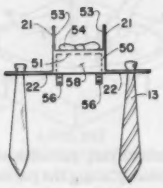
means projecting forwardly from said rear leg spaced from the front leg free end adapted to pierce the support rear side.

4,059,191

TIE RACK

Maurice J. Chaisson, Athol, Mass., assignor to The Raymond Lee Organization, Inc., New York, N.Y.

Filed Jan. 21, 1976, Ser. No. 650,947
Int. Cl.[2] A47F 7/12
U.S. Cl. 211—90 **1 Claim**



1. A tie rack assembly for supporting both neckties preformed with knots and conventional neck ties, comprising a rack formed of

a first shelf member fitted to a support member, said first shelf member fitted with a plurality of pairs of first slots from an edge of the said shelf member, with a pair of said first slots separated by a second slot.

said second slot of a greater width and depth than the said first slots, said first and second slots bounded by generally parallel walls, with said first slots of a width and spacing suitable for looping a necktie through two adjacent first slots, with the necktie hung by the finger of the shelf member between the two said adjacent first slots, with said

second slots each of a size to engage a knotted necktie under the necktie knot, in which

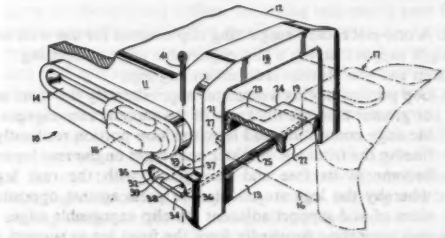
two such racks are joined together back-to-back, and separated by a second shelf member of a size to support a bow tie.

4,059,192

COUPLER HEIGHT ADJUSTER FOR RAILWAY CARS

Glen D. Larsen, Upper Marlboro, Md., assignor to Southern Railway Company, Washington, D.C.

Filed Jan. 21, 1977, Ser. No. 761,382
Int. Cl.[2] B61G 9/22
U.S. Cl. 213—61 **10 Claims**



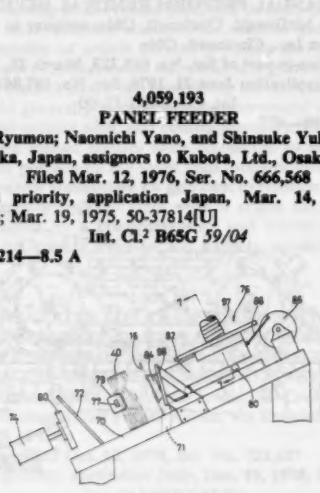
1. In combination, a striking casting having transversely spaced sidewalls with draft keyways formed therein and a coupler carrier member extending between and connected to said sidewalls, said carrier member having an upper surface for supporting a longitudinally extending coupler, a wear plate extending over said surface and having side flanges embracing said carrier member, and a shim disposed between said surface and said wear plate, the improvement wherein one of said sidewalls has a transversely extending opening through which said shim is adapted to be inserted, said opening being defined by spaced upper and lower walls and concavely curved end walls all extending transversely outwardly of said one sidewall, said upper wall having a predetermined thickness and said lower wall having a thickness greater than said predetermined thickness, whereby a support structure is defined for said opening wherein said end walls function to reduce stress concentration at said opening, said outwardly extending walls defining said opening serve to resist bending stresses of said striking casting, and said lower wall serves to further reduce stress concentration at said opening from torsional and other loads to which said striking casting is subjected.

4,059,193

PANEL FEEDER

Yutaka Ryumon; Naomichi Yano, and Shinsuke Yukimachi, all of Osaka, Japan, assignors to Kubota, Ltd., Osaka, Japan

Filed Mar. 12, 1976, Ser. No. 666,568
Claims priority, application Japan, Mar. 14, 1975, 50-35195[U]; Mar. 19, 1975, 50-37814[U]
Int. Cl.[2] B65G 59/04
U.S. Cl. 214—8.5 A **6 Claims**



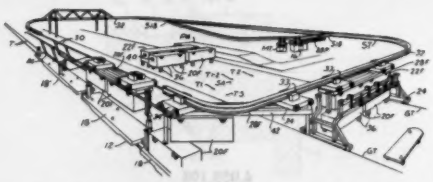
1. A panel feeder comprising a vacuum case provided at its front end with a vacuum suction opening and supported for reciprocal movement relative to a block of panels arranged substantially vertically side by side, reciprocating means coupled to the case to bring the suction opening toward or away from the panel block, a slanting panel support plate extending obliquely upward, the vacuum case being slidable in parallel to the support plate, the support plate being formed in its upper portion with a panel discharge opening immediately in front of the retracted position of the vacuum case, blocking members disposed above the discharge opening to impede the panel by contact therewith, and panel block pushing means disposed on a lower portion of the slanting support plate to push the panel block to the advanced position of the vacuum case, the vacuum case having a closure slidably engaging a stationary cover, the stationary cover having an inlet connected to a duct in communication with vacuum means, the closure being formed with an air aperture always in communication with the inlet of the stationary cover over the range of reciprocal movement of the vacuum case so as to maintain a vacuum within the vacuum case and to cause the vacuum suction opening to perform a vacuum sucking action, whereby the panels are fed one by one to an apparatus subsequent to the feeder.

4,059,194

CONTAINER OVERHEAD TRANSFER AND STORAGE SYSTEM

Leonard D. Barry, 19300 Pennington Drive, Detroit, Mich. 48221

Division of Ser. No. 269,239, July 5, 1972, Pat. No. 3,956,994.
This application May 17, 1976, Ser. No. 687,180
Int. Cl.[2] B61J 3/00
U.S. Cl. 214—38 CA 5 Claims



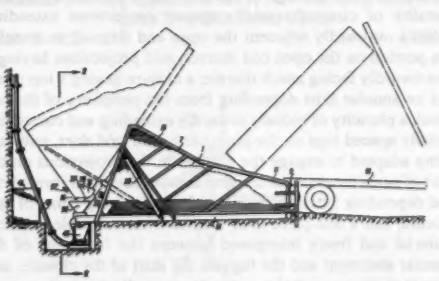
1. A container storage and transfer system having, containers, a stretch of railway track, a train thereon having transfer container cars therein, a container storage station along said track and including a gantry track having rails spaced apart, berths for storing containers in said station arranged in transverse rows each for at least one container between said rails, at least one gantry on said gantry track, said gantry having lift means for handling at least a container, a suspended station track run over said railway track for a transfer run and over said gantry, one or more container carriers on said station track for transfer of said containers between said gantry and said cars, said gantry having a bridge-like frame spanning said containers endwise when on said storage berths and having sides between which said carriers with containers can move lengthwise, means on said carriers for engaging supporting and releasing said containers, said gantry lift means being designed for lifting and moving said containers between said storage berths and said carriers thereabove.

4,059,195

MATERIAL HANDLING DEVICE

Eric John Christopher MacDonald, Rotherham, and Brian Snowdon, Doncaster, both of England, assignors to Macawber Engineering Limited, Great Britain

Filed Apr. 22, 1976, Ser. No. 679,163
Claims priority, application United Kingdom, Apr. 25, 1975, 17247/75
Int. Cl.[2] B65G 67/24
U.S. Cl. 214—44 R 4 Claims



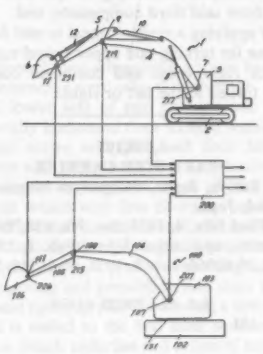
1. A material handling device for receiving a bulk delivery of granular or lumpy material from a tipper delivery vehicle and for transferring said material to a reception hopper of pneumatic material conveying apparatus, the device comprising a container in the form of an open-topped trough having a base substantially at ground level and having a first open end through which said tipper vehicle may be backed to unload its entire bulk delivery along the length of the container during subsequent forward movement of the vehicle, and a second, substantially funnel-shaped end, opposite said first end, having an apical opening, and a pivotally mounted closure member over said apical opening, the container being mounted for pivotal movement about an axis located a short distance beyond said second end; means connected to the device for moving said container pivotally about said axis between a first position for the reception of said tipper vehicle and its bulk delivery and a second, raised position in which the opening of said apical opening lies just above said reception hopper of the pneumatic conveying means, the pneumatic conveying means being located at least partially below ground level, the device further including means for causing said closure member to open during the latter stage of movement of the container from the first to the second position, the closure member being arranged to return to its original position under the influence of gravity when the container moves from the second to the first position.

4,059,196

SYSTEM FOR CONTROLLING A POWER SHOVEL

Hisanori Uchino; Masamichi Takada, both of Tokyo; Takahiro Shimizu, Kawasaki; Masamitsu Shibayama, and Fumiya Furuno, both of Yokohama, all of Japan, assignors to Hokushin Electric Works, Ltd., Tokyo, Japan

Filed Mar. 12, 1976, Ser. No. 666,381
Claims priority, application Japan, Oct. 15, 1975, 50-123196
Int. Cl.[2] E02F 3/32
U.S. Cl. 214—138 R 18 Claims



1. A system for controlling a power shovel consisting of an upper swivel turret section, a lower chassis section, a boom attached to said upper swivel turret section so as to be vertically turned by a first hydraulic actuator, an arm attached to one end of said boom so as to be turned by a second hydraulic actuator, a bucket attached to one end of said arm so as to turned by a third hydraulic actuator, a fourth hydraulic actuator for turning horizontally said upper swivel turret section, piping for feeding hydraulic fluid to said hydraulic actuators, and flow rate limiters provided in the piping so that said hydraulic actuators can be actuated for a given period of time from their starting time, said control system comprising:

A. a manual control lever consisting of a control boom, a control arm and a control bucket which are miniatures of said boom, arm and bucket of the power shovel, said manual control lever being capable of turning horizontally with respect to a base by hand and of taking up a neutral position in free,

B. means for generating a detected boom angle signal proportional to the turn angle of said boom,

C. means for generating a detected arm angle signal proportional to the turn angle of said arm,

D. means for generating a detected bucket angle signal proportional to the turn angle of said bucket,

E. means for generating a boom angle setting signal proportional to the turn angle of the control boom of said control lever,

F. means for generating an arm angle setting signal proportional to the turn angle of the control arm of said control lever,

G. means for generating a bucket angle setting signal proportional to the turn angle of the control bucket of said control lever,

H. a circuit for communicating said detected boom, arm and bucket angle signal generators with said control boom, arm and bucket reference signal generators, said circuit including:

i. a first comparator for comparing said detected boom angle signal with said boom reference signal and for generating a differential signal therebetween,

ii. a second comparator for comparing said detected arm angle signal with said arm reference signal and for generating a differential signal therebetween,

iii. a third comparator for comparing said detected bucket angle signal with said bucket reference signal and generating a differential signal therebetween,

iv. a circuit for transmitting a control signal to said first hydraulic actuator according to the differential signal received from said first comparator,

v. a circuit for transmitting a control signal to said second hydraulic actuator according to the differential signal received from said second comparator, and

vi. a circuit for transmitting a control signal to said third hydraulic actuator according to the differential signal received from said third comparator; and

I. means for applying a control signal to said fourth hydraulic actuator for turning said upper swivel turret section to the left or right when said combined control lever is manually turned to the left or right.

4,059,197

SPARE TIRE CARRIER

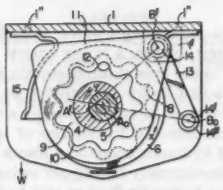
Hiroshi Iida, Kariya, Japan, assignor to Manno Kogyo Company, Limited, Japan

Filed Nov. 4, 1975, Ser. No. 628,784

Claims priority, application Japan, Feb. 1, 1975, 50-13762; May 20, 1975, 50-60066; Feb. 8, 1975, 50-16546; May 17, 1975, 50-58841

Int. Cl.² B62D *43/04*

U.S. Cl. 214—451 **6 Claims**



1. A spare tire carrier for vehicles comprising

a casing,

a shaft having a handle engaging portion at one end thereof and rotatably carried by said casing,

an eccentric cam fastened to said shaft,

an external gear rotatably fitted over said eccentric cam, said external gear being not only rotatable about its axis but also revolvable about the center of said shaft,

an internal gear rotatably mounted on said shaft and in mesh with said external gear,

means for restricting the motion of said external gear such that as said shaft is rotated said external gear causes the pilgrim-step motion of said internal gear, means operatively connected to said internal gear for hoisting a spare tire into an abutting relationship against an abutment surface on said vehicle,

said pilgrim-step motion being defined by such a motion that while said shaft is being rotated in one direction, said internal gear after it has been rotated through a predetermined angle is temporarily rotated in the direction opposite to that in which it has been rotated, thereby providing the locking effect between said tire and said abutment surface.

4,059,198

VAPOR-SEAL SAFETY CAP AND CONTAINER

George V. Mumford, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Jan. 26, 1977, Ser. No. 762,611

Int. Cl.² B65D *55/02, 85/56*

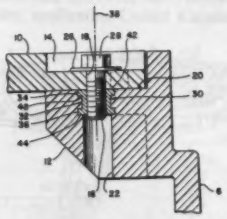
U.S. Cl. 215—222 **1 Claim**

1. A vapor-sealing, child-resistant closure and container combination comprising: an open-mouthed container having a plurality of circumferentially spaced projections extending radially outwardly adjacent the open end thereof, an annular rim portion on the open end thereof, said projections having a downwardly facing notch therein; a closure having a top panel and an annular skirt depending from the periphery of the top panel, a plurality of radially inwardly extending and circumferentially spaced lugs on the inner surface of said skirt, said lugs being adapted to engage the notches in the projections on the skirt of said container, an integral annular abutment formed on, and depending from, the inner surface of the top panel of said closure; and a one-piece liner formed from a flexible, resilient material and freely interposed between the free edge of the annular abutment and the lugs on the skirt of the closure, said liner including a central panel, a downwardly depending annular, W-shaped plug portion, and an outer peripheral margin, said annular abutment adapted to bias the central panel of the liner downwardly to force said plug portion into vaporsealing engagement with an interior surface of said container and the outer peripheral margin into sealing engagement with the annular rim on the container when the lugs on said closure are engaged within the notches in the projections on the skirt of the container.

4,059,199
UTILITY BOX FASTENER

Patrick E. Quaney, Fountain Valley, Calif., assignor to Associated Concrete Products, Inc., Santa Ana, Calif.

Filed June 28, 1976, Ser. No. 700,629
Int. Cl.² H02G 3/08
U.S. Cl. 220—3.8 6 Claims



1. A hold-down device for affixing a cover to a plastic box comprising:

a female fastener having a central shank portion with a threaded bore through its axis and top and bottom flanges at its opposite ends normal to the axis of the bore;

each said flange having a substantial thickness parallel to the axis of said bore to define a blunt peripheral bearing surface;

the bottom flange extending beyond the periphery of said central shank portion to form an upwardly facing shoulder entirely around the lower end of said shank;

a box composed of plastic material which undergoes significant compression under load;

a portion of said plastic box being molded tightly around said fastener and bearing against the peripheral bearing surfaces of the flanges and against the upwardly facing shoulder of the lower flange, said plastic extending in between the two flanges;

a cover on said box;

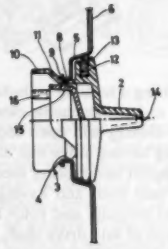
the upper surface of said upper flange bearing on said cover; and

a threaded bolt extending through said cover and threaded into said fastener.

4,059,200
PLASTIC FILLER CAP

Michele Aimar, Turin, Italy, assignor to ITW Fastex Italia, S.p.A., Turin, Italy

Filed Nov. 5, 1976, Ser. No. 739,227
Claims priority, application Italy, Nov. 10, 1975, 29127/75
Int. Cl.² B65D 53/00, 51/16
U.S. Cl. 220—233 4 Claims

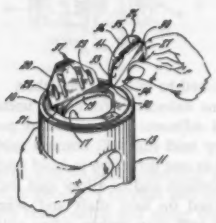


1. A plastic filler cap for tanks characterized in that the tank filler cap comprises a flange provided at the periphery thereof with a seal and at the center with an operating handgrip, and a hollow stem of a square shape in cross-section intended to engage a tank opening of corresponding shape in cross-section, said stem being formed of a pair of substantially co-axial squared sections angularly offset relative to each other by 45° and connected to each other by inclined walls so that by introducing the first section of said stem in the tank opening and rotating said cap by means of said handgrip for ¼ of a turn, the edges of said first stem section will deflect and by sliding said inclined walls connecting said pair of sections on the inner edges of said tank opening, said filler cap locks in the closed position when the second stem section engages in the opening and said first stem section projects from said opening to the inner portion of said tank.

4,059,201
CONTAINER CLOSURE WITH FOIL SEAL

John A. Foster, Rockford, Ill., assignor to J. L. Clark Manufacturing Co., Rockford, Ill.

Filed Mar. 14, 1977, Ser. No. 777,068
Int. Cl.² B65D 51/22
U.S. Cl. 220—258 15 Claims



1. A container closure comprising a cover having a dispensing opening extending vertically therethrough, a tearable film covering the lower side of said opening and sealed to said cover, a generally horizontal door located within said opening and positioned above said film, said door having first and second sections with at least said first door section corresponding substantially in shape to the shape of that portion of the opening within which said first door section is located, two pivots made of breakable material and alined with one another along an axis defining the dividing line between said first and second door sections, said pivots connecting said door to the wall of said opening and permitting said door to swing vertically within said opening, said film having a first portion which underlies and is sealed to the first door section and having a second portion which underlies and is free of said door section, and means depending from said first door section for puncturing a hole in said first film portion when finger pressure is initially applied to said first door section in a direction to swing the latter downwardly whereby such downward swinging causes said first door section to tear the punctured first film portion away from the margins of said opening, said second door section swinging upwardly as said first door section swings downwardly and defining a finger grip which may be held and pulled upwardly to break said pivots and enable removal of said door from said opening, said first film portion remaining sealed to said first door section and causing said second film portion to tear away from the margins of said opening as said door is removed from said opening.

4,059,202
COVER PLATE HAVING ADJUSTABLE LATCH MEANS

John P. Jones, Jr., Greenwich, Conn., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Mar. 9, 1977, Ser. No. 776,086
Int. Cl.² B65D 45/16
U.S. Cl. 220—325 10 Claims

1. A cover plate for closing an opening through a deck or the like, said cover plate comprising:

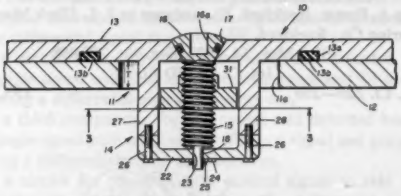
a plate element slightly larger than said opening to be closed;

a seal means on the underside of said plate element for cooperating with said deck or the like around said opening to prevent leakage around said cover plate when said cover plate is in an operable position; and

a plurality of adjustable latch means spaced around and near the outer periphery of said plate element, each of said latch means comprising:

a shaft extending through and journaled to said plate element and having a threaded portion extending from the underside of said plate element;

a lock member threaded onto said threaded portion of said shaft, the periphery of said lock means having a substantially circular portion and a flattened side;



a lug attached to said lock member;

stop means extending from the underside of said plate element adjacent said threaded portion of said shaft whereby said lug will contact said stop means when rotated in one direction to hold said lock member in an open position and to allow said lock member to move downward on said shaft and whereby said lug will contact said stop means when rotated in an opposite direction to hold said lock means in an closed position and to allow said lock member to move upward on said shaft.

4,059,203

DISPENSING OF LABELS

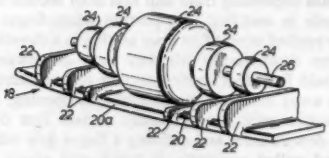
Maurice J. Wright, Rutland, England, assignor to Norprint Limited, Boston, England

Filed May 14, 1976, Ser. No. 686,532

Claims priority, application United Kingdom, May 15, 1975, 20525/75

Int. Cl.² B65H 5/28

U.S. Cl. 221—73 **13 Claims**



1. A method of dispensing a pressure-sensitive adhesive label carried by a backing strip such that the label can be peeled from the strip, said strip having a central portion and lateral portions at each side of the central portion, said method comprising providing a dispense edge having a central portion in contact with the central portion of the strip, and lateral portions in contact with the lateral portions of the strip, with the central portion of the edge being located in front on the lateral portions of the edge, passing a strip over the dispense edge to peel the strip from a said label with peeling commencing at the central portion, providing the label and strip with a curvature transversely to the direction of dispense during peeling of the strip, and providing the curved strip with a constant path length across its width during passage of the strip over the dispense edge.

4,059,204

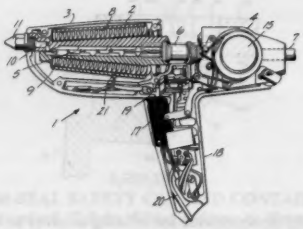
SYSTEM FOR DISPENSING AND CONTROLLING THE TEMPERATURE OF HOT MELT ADHESIVE

Robert John Duncan, Magnolia, and Richard Montgomery Elliott, Beverly, both of Mass., assignors to USM Corporation, Boston, Mass.

Filed Oct. 26, 1976, Ser. No. 735,191

Int. Cl.² B67D 5/62

U.S. Cl. 222—146 HE **8 Claims**



1. In a hot melt material dispensing appliance having means to intermittently feed a rod of material through a heated melt body having a material retaining chamber constructed therein in order to cause a flow of hot fluid material therefrom, a system to control the temperature of the material comprising:

A. a first control circuit connected to regulate the energization of the melt body heaters in response to the temperature of the melt body to provide heat sufficent to raise the material in the chamber to a predetermined temperature; and

B. a second control circuit connected to increase the temperature at which the melt body heaters are regulated during the introduction of fresh material to the chamber in order to compensate for the drop in output material temperature caused thereby.

4,059,205

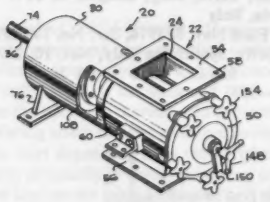
ROTARY VALVE

Robert D. Heyl, Williamsport, Pa., assignor to The Young Industries, Inc., Muncy, Pa.

Filed Apr. 16, 1976, Ser. No. 677,862

Int. Cl.² G01F 11/00

U.S. Cl. 222—368 **23 Claims**



1. A valve comprising a housing including an inlet, an outlet and an access open end, a detachable closure means mounted on said housing for closing said open end, a drive shaft journalled in said housing having a free end disposed between said inlet and outlet, adjacent said closure means, a rotor mounted on the free end of said shaft and having an annular surface engageable with said housing, said rotor being axially removable from the free end of said drive shaft, said annular surface having at least one recess communicable with said inlet and outlet by rotating the drive shaft for conveying material from said inlet to said outlet, a first axial seal disposed between said housing and said rotor, and a second axial seal disposed between said rotor and said closure means, in substantial longitudinal alignment with said first axial seal thereby providing a

valve which is easily disassembled without removing the drive shaft to facilitate replacement of seals and cleaning.

4,059,206

EXTRUSION MACHINE HAVING COLLAR FOR SEAL

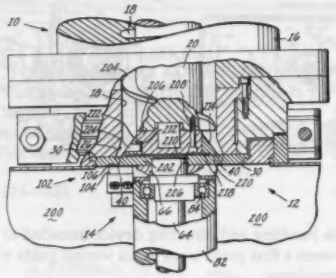
Henry Ellwood, Rochdale, England, assignor to USM Corporation, Boston, Mass.

Filed July 28, 1975, Ser. No. 599,380

Claims priority, application United Kingdom, Aug. 17, 1974, 36315/74

Int. Cl.[2] B29F *3/04*

U.S. Cl. 222—413 2 Claims



1. A plastic extrusion machine having a screw rotatable in a chamber for plasticating and transporting plastic material, an annularly perforated wall at one end of the chamber through which material is extruded, a collar slidable on the end of the screw against a central portion of the wall in response to movement of material in the chamber toward said wall forming a seal to prevent ingress of the material into a stagnant area between the end of the screw and the wall.

4,059,207

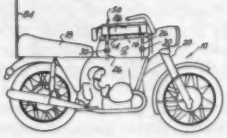
MOTORCYCLE TANK BAG

W. Shaun Jackson, 809 Sycamore, Ann Arbor, Mich. 48104, and Leslie Eric Bohm, 29560 Rutherland, North, Southfield, Mich. 48076

Filed Mar. 26, 1975, Ser. No. 562,262

Int. Cl.[2] B62J *7/02*

U.S. Cl. 224—31 6 Claims



1. In an article retaining system adapted to be supported on the upper surface of a motorcycle fuel tank, in combination: a pair of elongated flexible straps; fastener means affixed to said straps so that they may be arranged in loops adapted to surround the tank and thereby be secured to the tank; a flat resilient pad adapted to be secured to the top of the tank beneath the elongated straps to act as a supporting surface for a flexible bag; said flexible bag having a flat side adapted to be supported on the top of the pad and having an opening flap for providing access to the interior of the bag; separable closure means adapted to releasably secure the flap to the bag to close the bag; and quick release fastener means including fastener elements secured to each of said elongated straps and to said bag and adapted to be engaged to releasably retain said bag on said motorcycle fuel tank independently of the securement of the straps to the motorcycle fuel tank by the fastener means, whereby said bag may be quickly installed and released from the motorcycle fuel tank without removal of said straps and pad from said motorcycle fuel tank.

4,059,208

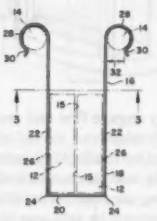
SKI AND POLE TOTE

Robert L. Koepcke, Onalaska, Wis., assignor to Arro Corporation, La Crosse, Wis.

Filed Mar. 15, 1976, Ser. No. 666,896

Int. Cl.[2] A44B *21/00*

U.S. Cl. 224—45 S 9 Claims



1. A ski and ski pole tote for simultaneously hand carrying a pair of skis arranged in generally parallel and horizontal, longitudinally coextensive relationship and along their minor transverse axis in bottom-to-bottom facing relationship and with their major transverse axis extending upwardly and a pair of generally parallel ski poles each spaced about the same distance above the pair of skis along said major transverse axis in longitudinally coextensive relationship with said pair of skis comprising: a pair of U-shaped clasps for connecting the skis and poles to be spaced longitudinally along the skis and ski poles and each clasp including a base portion positioned to extend along said minor transverse axis below the pair of skis, a first leg connected to one end of said base portion and positioned to extend adjacent the top face of one of the skis along said major transverse axis, to the one of said poles closest to said one ski, said first leg including a portion spanning the vertical spatial distance adjacent said first leg between the uppermost edge of said one ski and the lowermost edge of said one pole, and a second leg connected to the other end of said base portion and positioned to extend adjacent the top face of the other of the skis along said major transverse axis, to the other of said poles closest to said other ski, said second leg including a portion spanning the vertical spatial distance adjacent said other leg between the uppermost edge of said other ski and the lowermost edge of said other pole, each of said legs terminating in a partially closed single loop positioned to extend partially over and about the pole adjacent thereto, whereby said skis and ski poles may be toted as an assembly by hand grasping said ski poles intermediate said clasps.

4,059,209

CARRIER AND LOCK FOR SKI EQUIPMENT

Byron Lynn Grisel, Wasilla, Alaska, assignor to Grizzley Ski Lock Corporation, Salt Lake City, Utah

Filed July 1, 1976, Ser. No. 701,590

Int. Cl.[2] B65D *69/00*

U.S. Cl. 224—45 S 10 Claims

1. A carrier and lock for ski equipment comprising

a pair of side frames, each having opposite ends;

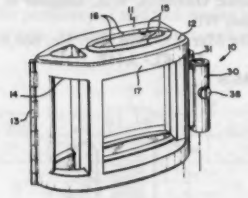
hinge means connecting said side frames to open and close in clamshell fashion;

an elongate handle formed by said side frames, said handle being at the same end of said side frames as the hinge means;

opposed recesses in the side frames, said recesses being arranged to receive a pair of skis and a pair of ski poles therein when said skis and poles are clamped between said side frames;

means to releasably latch the side frames together, with a pair of skis and a pair of ski poles clamped therebetween;

a locking member on each side frame, at the end thereof opposite to the hinge, said locking members being arranged to slidably engage first and second receiving members, respectively; and



a lock means carried by the locking member on one said side frame for securing said last mentioned locking member to said first receiving member, whereby the other said side frame is held clamped to said one side frame by the engagement of its locking member with said second receiving member.

4,059,210

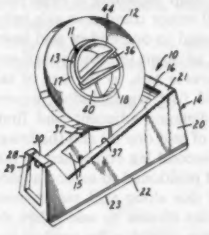
TAPE DISPENSER

Hartland W. Deering, Jr., St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jan. 10, 1977, Ser. No. 757,937

Int. Cl.² B26F *3/02*

U.S. Cl. 225—47 **5 Claims**



1. In a dispenser for a roll of tape comprising a length of tape helically wound on a core which core has a central opening defined by a cylindrical inner surface, said dispenser being of the type comprising a base having walls defining a cavity adapted to receive a portion of a said roll of tape, means mounted on said base adapted for rotatably supporting the roll of tape in a dispense position with a portion of the tape roll in said cavity and means mounted on said base for severing tape pulled from said roll, the improvement wherein said means adapted for rotatably supporting the roll of tape is a core support having an arcuate peripheral surface with a radius which is smaller than the radius of the inner surface of a said core to afford free rotation of the core about said peripheral surface, a slide member fixed at one end of said core support and slidably mounted on said base to prevent rotation of said core support relative to said base, to restrict separation of said core support from said base, and to afford movement of said core support between said dispense position at which surfaces of the walls defining said cavity limit axial movement of the roll of tape about the core support and a load position at which the core support is spaced away from the base in a position affording installation or removal of a roll of tape over an end of said core support.

4,059,211

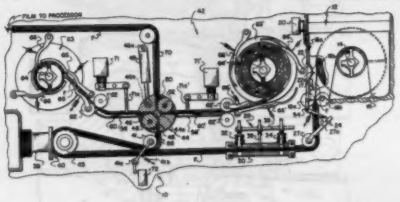
WEB MATERIAL STORAGE DEVICE

Ernest E. Brizzolara, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 21, 1977, Ser. No. 761,179

Int. Cl.² B65H *25/00*

U.S. Cl. 226—11 **2 Claims**



1. A film handling and directing device intended to be interposed between a first guide track and a second guide track; said device comprising:

a plurality of storage means, each of said storage means being adapted to receive and store film and then to supply the previously stored film; and

a rotatable turret having a first and a second track, one of said tracks directing web material into one of said storage means while the other of said tracks simultaneously directs web material out of another of said storage means.

4,059,212

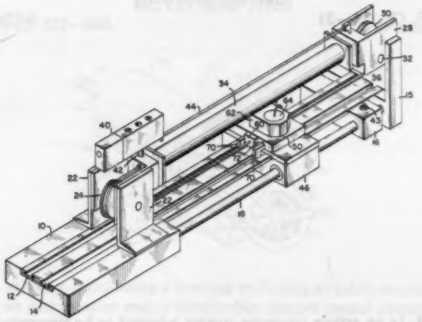
STOCK FEEDER FOR PUNCHED STOCK

Harry James Ledgerwood, Conway, Mo., assignor to Plessey Incorporated, Mellville, N.Y.

Filed Feb. 3, 1977, Ser. No. 765,358

Int. Cl.² B65H *17/36*

U.S. Cl. 226—141 **8 Claims**



1. A stock feeder for moving indexed or pre-punched stock comprising:

track means for supporting said stock as it moves through said feeder;

a mounting block at the forward end of said track;

a rear block and stabilizer bar at the rear end of said track;

guide rails supported between said mounting and rear blocks;

a feed block assembly movably supported on said guide rails; and including feed pilot means for engaging index holes from one side of said stock;

holding pilot means in said mounting block adapted to engage index holes from the other side of said stock;

fluid-actuated piston and cylinder means spaced from and parallel to said guide rails, and including pulley and cable means operably secured to said feed block assembly and said piston means; and

actuating means to (a) engage said feed pilot means and disengage said holding pilot means at the beginning of a stroke. (b) actuate said piston means to move said feed block assembly along said rails, advancing said stock, (c) disengage said feed pilot means and engage said hold pilot means at the end of a stroke, and (d) actuate said piston means to return said feed block assembly to said starting position.

4,059,213

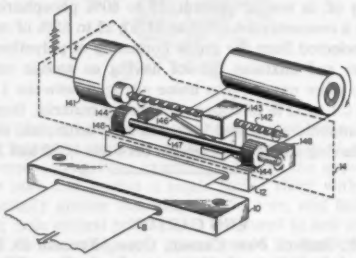
CLUTCHLESS PAPER ADVANCE MECHANISM

Timothy L. Toomay, Palo Alto, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Continuation of Ser. No. 515,729, Oct. 17, 1974, abandoned. This application June 7, 1976, Ser. No. 693,565

Int. Cl.² B65H *17/44*

U.S. Cl. 226—151 **10 Claims**



1. Apparatus for advancing paper along a guide path, said apparatus comprising:

first paper-engaging means, non-rotatably mounted for translation along the guide path including a roller, said roller being responsive to movement of the means in a first direction relative to the paper for non-slidably gripping the paper and for advancing the paper in the first direction, and to movement of the means in a second direction relative to the paper for rollably engaging the paper;

drive means coupled to the first paper-engaging device for moving that device in the first and second directions; and

second paper-engaging means non-rotatably and fixedly mounted in the guide path and including a roller, said roller being responsive to movement of the paper in the first direction for rollably engaging the paper, and to movement of the paper in the second direction for non-slidably gripping the paper and for preventing movement of the paper in the second direction when the first paper-engaging means is moving in that direction;

said second paper-engaging means including means for releasing its non-slidable grip with the paper when the force tending to cause the paper to move in the second direction exceeds a first value.

4,059,214

FORGING PROCESS

Gerd Weissmann, Munich, Germany, assignor to Bayerisches Leichtmetallwerk Graf Blucher von Wahlstatt KG, Munich, Germany

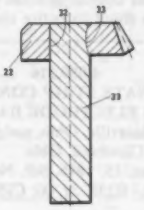
Filed Dec. 4, 1975, Ser. No. 637,837

Claims priority, application Germany, Dec. 10, 1974, 2458291

Int. Cl.² B23K *19/00*

U.S. Cl. 228—265 **10 Claims**

1. A method of producing a unitary workpiece from at least two components of different materials comprising the steps of forming one of said components as a body made of a smelt-metallurgical material, forming the other of said components as a pressed and presintered forming member made of a powder-metallurgical material, one of said members having a conically tapering hole and the other of said members having a conformingly tapered plug adapted to fit in said hole in close contact therewith, thereafter locating said components in respective die-halves of a forging press in a hole and plur interconnecting



arrangement, said die-halves having both radial and axial restriction surfaces for each of said components and thereafter forging said components into a desired shape by relative axial movement of said die-halves to compress the axial distance therebetween and under such conditions of heat and pressure as to upset the material of each of said components at least along the juncture of their interconnection in both the radial and axial direction to simultaneously form a welded bond therebetween.

4,059,215

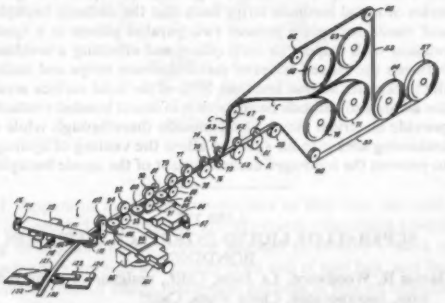
CIRCULAR DOUBLE-JACKETED GASKET WITH SINGLE JOINT

Alfred B. Owen, and Bruce M. Gifford, both of Houston, Tex., assignors to Lamons Metal Gasket Company

Continuation-in-part of Ser. No. 534,436, Dec. 19, 1974, abandoned. This application Sept. 5, 1975, Ser. No. 610,561

Int. Cl.² F16J *15/12*

U.S. Cl. 228—173 C **41 Claims**



1. The method of forming a circular double-jacketed gasket from a substantially linear double-jacketed gasket assembly having a substantially rectangular cross-section including a first metal strip forming a shell having a base portion and side portions with the width dimension of the base portion being greater than the dimension of the side portions, a filler strip of resilient core material confined between said side portions and a second metal strip forming a liner having a base portion overlying the core and substantially the same width dimension as the base portion of the first metal strip with the outer edges of the second metal strip confined by the side portions of the first metal strip, comprising:

compressing the base portions of the linear double-jacketed

gasket assembly with a substantially even compression between compression rolls;

curving the linear double-jacketed gasket assembly edgewise in a plane parallel to said base portions a predetermined amount at the nip between the compression rolls to form a uniform, circular gasket assembly having a predetermined radius of curvature with the metal shell and liner being free of undesired buckling or wrinkling;

severing a circular gasket unit from the gasket assembly; and

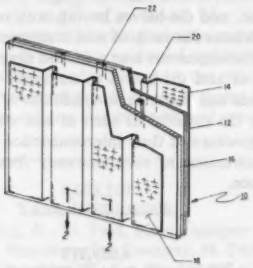
securing together the severed ends of the circular gasket unit to form a circular double-jacketed gasket having a single joint connection about its entire circumference.

4,059,216

METAL LAMINATE STRIP CONSTRUCTION OF BIPOLAR ELECTRODE BACKPLATES

Lewis M. Meyer, Painesville, Ohio, assignor to Diamond Shamrock Corporation, Cleveland, Ohio

Filed Dec. 15, 1975, Ser. No. 640,646
Int. Cl.[2] B23K *31/00*; C25B *11/10*
U.S. Cl. 228—179 **7 Claims**



1. A method for mechanically and electrically connecting the anode and cathode backplates of a bipolar electrode for use in an electrolytic cell comprising the steps of: placing a spaced series of metal laminate strips having surfaces of identical and corresponding metallic makeup to the metallic makeup of the corresponding backplates upon one of said backplates; placing the other backplate in direct alignment on top of the spaced series of metal laminate strips such that the cathode backplate and anode backplate present two parallel planes in a spaced relation with respect to each other; and effecting a weldment between the spaced series of metal laminate strips and each of the backplates so that less than 50% of the total surface area of the anode and cathode backplates is in direct bonded contact to provide electrical current transmission therethrough while the remaining area is an air space to allow the venting of hydrogen to prevent the hydrogen embrittlement of the anode backplate.

4,059,217

SUPERALLOY LIQUID INTERFACE DIFFUSION BONDING

James R. Woodward, La Jolla, Calif., assignor to Rohr Industries, Incorporated, Chula Vista, Calif.

Filed Dec. 30, 1975, Ser. No. 645,381
Int. Cl.[2] B23K *19/00*
U.S. Cl. 228—181 **38 Claims**

1. A process for joining nickel and/or cobalt based on superalloys which comprises the steps of:

a. providing and masking elements to be joined together, said elements being formed of material taken from the class consisting of nickel based and cobalt based alloys,

b. simultaneously applying to the faying surface of at least one of said elements by plating directly thereon from a single chemical bath of a layer taken from the class consisting of nickel, cobalt and a combination thereof and from about 4 to about 12 weight percent boron,

c. demasking said elements and holding the elements together at their faying surfaces with sufficient force to maintain contact at the faying surfaces, and

d. heating the elements to a temperature in the range of 1950° to 2150° F for more than one hour to cause the deposit to melt and form a metallurgical joint.

4,059,218

METHOD OF SOLDERING WITH PHOSPHORIC ACID SOLDERING FLUX

Edward G. Choby, Jr., Pittsburgh, Pa., assignor to Allegheny Ludlum Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 535,765, Dec. 23, 1974, Pat. No. 3,985,587. This application June 25, 1976, Ser. No. 699,832
Int. Cl.[2] B23K *1/00, 35/24*
U.S. Cl. 228—207 **11 Claims**

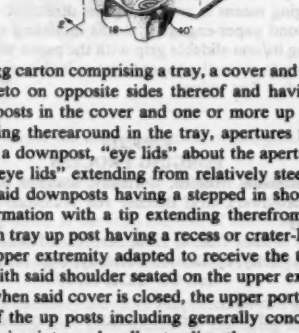
1. In the soldering of copper, stainless steel and copper-plated stainless steel wherein metal selected from the group consisting of copper, stainless steel and copper-plated stainless steel is placed in close proximity with other metal, solder and soldering flux, and wherein said solder is melted and applied to said metals in such a way that it solidifies and effects a bond therebetween; the improvement which comprises utilizing a soldering flux comprised of a viscous fluid; said fluid consisting essentially of, in weight percent, 25 to 80% phosphoric acid (based on a concentration of 75 to 95%), 15 to 65% of organic material selected from the group consisting of polyethers and polyimines and mixtures thereof having an atomic ratio of carbon to ether oxygen plus imine nitrogen between 1.5 and 3.1, from 0.1 to 15% of copper containing material, from 0 to 40% of ammonium salt, and from 0 to 30% water; said organic material having a molecular weight between 4,000 and 20,000.

4,059,219

EGG CARTON

Richard F. Reifers, New Canaan, Conn.; Kenneth D. Bixler, Huntington, N.Y., and Henry A. Lord, Cape Elizabeth, Maine, assignors to Diamond International Corporation, New York, N.Y.

and a continuation-in-part of Ser. No. 654,017, Jan. 30, 1976, Continuation-in-part of Ser. No. 609,078, Aug. 29, 1975. This application May 19, 1976, Ser. No. 688,000
The portion of the term of this patent subsequent to May 24, 1994, has been disclaimed.
Int. Cl.[2] B65D *1/24, 5/48*
U.S. Cl. 229—2.5 EC **10 Claims**



1. In an egg carton comprising a tray, a cover and a lock flap hinged thereto on opposite sides thereof and having one or more downposts in the cover and one or more up posts with cells extending therearound in the tray, apertures formed on each side of a downpost, "eye lids" about the aperture formations, said "eye lids" extending from relatively steep walls in the cover, said downposts having a stepped in shoulder on a plug-like formation with a tip extending therefrom at its extremity, each tray up post having a recess or crater-like formation at its upper extremity adapted to receive the tip of each downpost with said shoulder seated on the upper extremity of an up post when said cover is closed, the upper portions of the side walls of the up posts including generally concave yieldable areas facing into each cell extending therearound, the tip

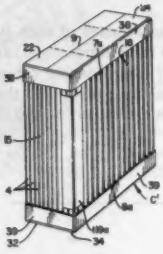
of each downpost and the bottom of the crater of each up post associated therewith being spaced apart from each other a distinct distance when the cover is initially closed with the distinct distance disappearing when a load of such magnitude as that of a plurality of loaded egg cartons are stacked thereon.

4,059,220

REINFORCED SINGLE-FACE CORRUGATED CONTAINERS

Achim R. Lorenz, Atlanta, Ga., assignor to MacMillan Bloedel Containers, Inc., Cleveland, Ohio

Filed July 14, 1976, Ser. No. 705,053
Int. Cl.² B65D *5/02*
U.S. Cl. 229—37 R **4 Claims**



1. A slotted box blank comprising a two-piece laminated board having a generally rectangular corrugated core with transverse corrugations extending between the opposite sides of the core and having a single facing sheet with a width substantially greater than that of said core, said facing sheet having main central portion that is secured to and covers one face of the core and a pair of overturned fly portions that are secured to and cover outer side portions only of the opposite face of the core, each of said fly portions having a length several times its width and extending along said opposite sides of the core to provide reinforced side edges, said box blank having a first set of parallel fold lines transverse to said fly portions which divide the blank into a series of wall panels including rectangular front and back wall panels of the same width and a pair of side wall panels of the same width located on opposite sides of said front wall panel, a major portion of the corrugated core of each wall panel being exposed between the outer edges of said fly portions, said box blank having a second set of fold lines on said fly portions which extend lengthwise over said fly portions to define a plurality of double-faced corrugated end flaps, each of which is hingedly connected to one of said wall panels along a fold line of said second set, and a series of slots extending from the fold lines of said second set to the outer edges of the blank to separate said end flaps, said flaps having a width at least about half the width of said side wall panels for closing opposite ends of the assembled box.

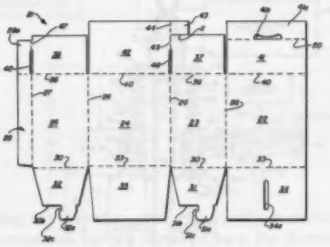
4,059,221

SHIPPING CONTAINER AND BLANK THEREFOR

Gregory J. Olson, and Wayne A. Chapman, both of Burlington, Wis., assignors to Packaging Corporation of America, Evanston, Ill.

Filed Aug. 4, 1976, Ser. No. 711,493
Int. Cl.² B65D *5/10*
U.S. Cl. 229—39 R **9 Claims**

1. A blank of foldable sheet material for a shipping container, comprising at least four side panels arranged in side by side relation, first foldlines interconnecting adjacent panels; a first set of end closure flaps connected by second foldlines to corresponding peripheral segments of said side panels and including a first pair of alternate closure flaps, each being provided with a complemental locking tab projecting outwardly from an outer peripheral edge of the flap and disposed off-center with respect to said outer peripheral edge, and a second pair of alternate end closure flaps, one flap of said second pair being provided with an elongated slot disposed substantially transversely of said second foldlines and being substantially aligned with the center of the outer peripheral edges of the first pair of alternate closure flaps and being sized to interlockingly accommodate said complemental locking tabs, when the blank is set



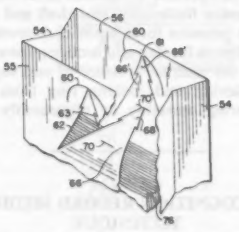
up to form the shipping container, the second flap of said second pair of end closure flaps being sized to conform substantially to the area delimited by the side panels when the blank is set up to form the container and being adapted to be disposed inwardly of the said one flap; and a second set of closure flaps connected by third foldlines to second corresponding peripheral segments of said side panels.

4,059,222

NEWSPAPER RECYCLING APPARATUS AND METHOD

Bruce Gamble, 815 Rosedale Ave., Lafayette, Calif. 94549

Continuation-in-part of Ser. No. 506,090, Sept. 16, 1974, Pat. No. 3,977,596. This application July 14, 1976, Ser. No. 705,196
Int. Cl.² B65D *33/12, 33/24*
U.S. Cl. 229—54 R **12 Claims**

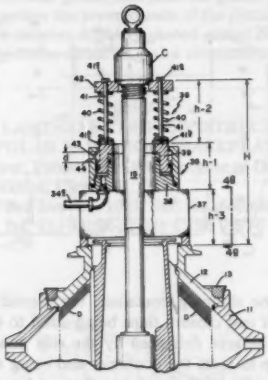


1. Apparatus for bailing newspapers so that they can easily be transported for recycling, said apparatus comprising a paper bag having an interior volume adapted to receive a stack of newspapers through a normally open end of said bag, said bag including mirror image juxtaposed patterns of slits on opposite sides of the bag generally near said open end, each said pattern of slits including a first generally transverse slit adapted to define a handle element, a pair of slits depending from proximate said first transverse slit to define a flap element, the distance between said depending slits being less at the upper end of said flap element than at a lower portion thereof, and a second transverse slit located between the depending slits at said lower portion of the flap element to provide a slot, the flap elements defined on said opposite sides of the bag adapted to fold over the stack of newspapers within the bag and each other and the upper ends of each said flap element adapted to fit into the slot of the other respective flap element to encapsulate the newspapers in the bag for carrying with the handle elements.

4,059,223
CENTRIFUGE PRESSURE RELIEF DEVICE

Kenneth Dan Lewis, Wilton, Conn., assignor to Dorr-Oliver Incorporated, Stamford, Conn.

Filed Aug. 16, 1976, Ser. No. 714,645
Int. Cl.[2] B04B 7/00
U.S. Cl. 233—1 R 24 Claims



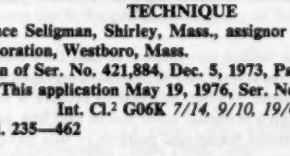
1. A pressure relief device for use in combination with the rotor of a nozzle type centrifugal machine having a threaded locking ring securing the cover section to the main body section of the rotor bowl against internal compression pressure exerted by a stack of separating discs confined between the top and bottom of the rotor bowl, and concentrically surrounding the rotor shaft, said shaft extending from said main body section through the open end of said cover section,

said pressure relief device being located within the area surrounded by said locking ring, comprising force imparting means cooperatively associated with the upwardly exposed end portion of said shaft and with said cover section, said force imparting means being constructed and arranged to be operable so that said force imparting means impose a tension force upon said shaft and a corresponding reaction pressure force upon said cover section, said interacting forces forcing said sections towards each other and against the internal pressure of said separating discs, thereby relieving said locking ring from said internal pressure during assembly or disassembly of the rotor bowl.

4,059,224
CODE RECOGNITION RECORD MEDIUM AND TECHNIQUE

Lawrence Seligman, Shirley, Mass., assignor to Data General Corporation, Westboro, Mass.

Division of Ser. No. 421,884, Dec. 5, 1973, Pat. No. 3,979,577.
This application May 19, 1976, Ser. No. 687,738
Int. Cl.[2] G06K 7/14, 9/10, 19/06
U.S. Cl. 235—462 2 Claims



1. The method of reading on a record medium a two level code representing at least one character of a set of characters, each of said characters being depicted as a group of substantially parallel bars with spaces therebetween, collectively positioned on a surface adapted to be informationally scanned along said surface in a generally linear direction generally perpendicular to all of said bars, wherein no one character has more than seven modules of information represented by said code and each character is arranged in a configuration so that two consecutive modules of a first level are not immediately followed by two consecutive modules of a second level, the code for each character defined by at least six consecutive transitional occurrences between the two levels of the code, said method comprising the steps of:

scanning the record medium to derive a time based electrical signal denoting said transitional occurrences;

measuring from said electrical signal at least the first four periods between alternate ones of said transitional occurrences;

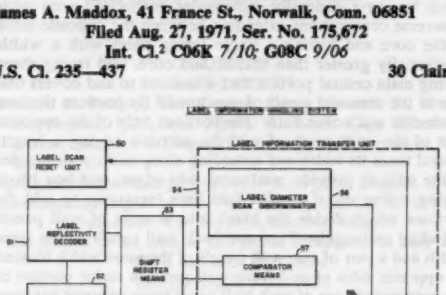
comparing the measurements of each two overlapping periods to generate three ratios, each ratio representing not more than one of three possible values, said values being approximately one, two-thirds and three-halves, and;

decoding the values arrived at for said three ratios to define a character.

4,059,225
LABELS AND LABEL READERS

James A. Maddox, 41 France St., Norwalk, Conn. 06851

Filed Aug. 27, 1971, Ser. No. 175,672
Int. Cl.[2] C06K 7/10; G08C 9/06
U.S. Cl. 235—437 30 Claims



1. A code identification system comprising:

A. an encoded label comprising a plurality of concentric curved bands of contrasting radiation reflectivity levels representing between one and a plurality of bits depending upon its radial width, wherein only a scan substantially along the diameter of the concentric curved bands provides a complete reading of the code with the first half of the scan being substantially identical to the second half of the scan;

B. a source of radiation for impingement upon the coded label;

C. a movable beam redirecting surface adapted for projecting and sweeping the projected radiation beam across the coded label;

D. a label information assembly comprising

a. means for translating the reflected radiation into an output signal incorporating clock means for providing a signal corresponding to successive bits, when said band comprises a width greater than one bit, and

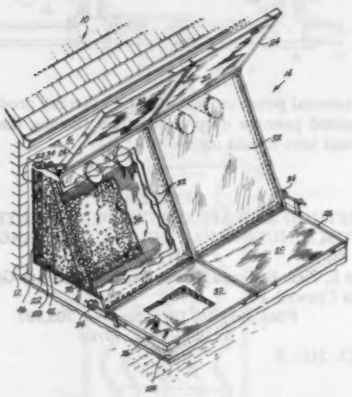
b. a label reading sub-assembly for providing a data ready signal when the first half of a first scan is substantially identical to the second half of the first scan.

4,059,226

HEAT COLLECTOR AND STORAGE CHAMBER

David L. Atkinson, 23608 48 West, Mountlake Terrace, Wash. 98043

Filed Sept. 2, 1976, Ser. No. 719,365
Int. Cl.[2] F24J 3/02
U.S. Cl. 237—1 A 9 Claims



1. A heat collector and storage chamber having top and bottom walls forming vertically, spaced apart, horizontally extending walls, comprising a front, glass wall extending forwardly and downwardly in said chamber and disposed in the path of rays emanating from the sun; a front rock retaining mesh screen wall disposed in said chamber and in spaced relation to said glass wall; a first baffle wall disposed in said chamber, and in spaced relation to said screen wall and extending generally vertically from one of said horizontal walls toward but terminating short of the other wall thereof, thereby forming a first rock chamber with an adjacent one of said horizontal walls; a second baffle wall disposed in said chamber and in spaced relation to said first baffle wall and extending generally vertically from the other of said horizontal walls toward but terminating short of the one of said horizontal walls with an entrance adjacent the other of said horizontal walls, thereby forming a second rock chamber; a plurality of dark surfaces, irregular shaped pieces of rock disposed in said first and second rock chambers with spaces between pieces of rock; and air circulation means causing the air to pass in one direction in said first rock chamber, in the opposite direction in said second rock chamber, and to return to the entrance of the first rock chamber.

4,059,227

MOISTURE SENSING APPARATUS AND METHOD

Edwin J. Hunter, Rancho Santa Fe, Calif., assignor to The Toro Company, San Marcos, Calif.

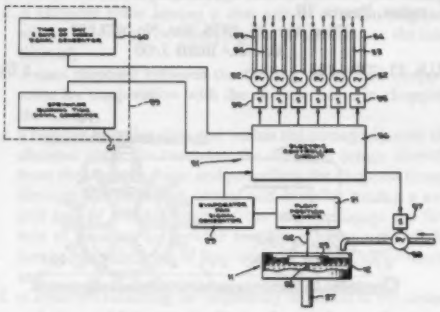
Filed May 17, 1976, Ser. No. 687,356
Int. Cl.[2] B05B 12/12; A01G 25/16; G01F 23/06
U.S. Cl. 239—1 16 Claims

1. A method of controlling the operation of a plurality of pilot valves associated with water lines of an irrigation system for watering a desired soil area comprising the steps of:

providing a body of water in a container adjacent said soil area and exposing said water to the combined evaporative effects of the ambient weather conditions at the location of said irrigation system;

continually sensing the change in volume of water of said body of water as it occurs in response to evaporation thereof at all times and at all levels thereof;

generating an electrical signal responsive to the change in water volume continually being sensed in response to said combined evaporative effects occurring prior to the initiation of watering without physically measuring the amount of moisture present in the soil of the area being watered; and



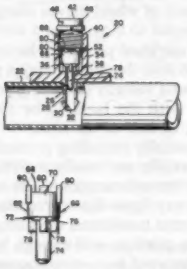
modifying the operation of an electrically operated controller mechanism by said signal to vary the duration of the controller mechanism operation of said pilot valves.

4,059,228

SELF CLEANING, PRESSURE RESPONSIVE EMITTER VALVE FOR SOIL IRRIGATION

David Werner, Los Angeles, Calif., assignor to Salco Products, Inc., Hawthorne, Calif.

Filed Sept. 3, 1974, Ser. No. 502,549
Int. Cl.[2] B05B 1/30
U.S. Cl. 239—106 44 Claims



25. An emitter valve for irrigation of soil from a supply of water comprising:

an enclosure having means therein for defining a cavity with surrounding side walls, and walls terminating said cavity means and having therein means for defining an outlet to the soil and means for defining an inlet coupled to the supply of water for enabling flow of the water to the soil;

an element positioned in said cavity means and having means for acting as a valve with said outlet means; and

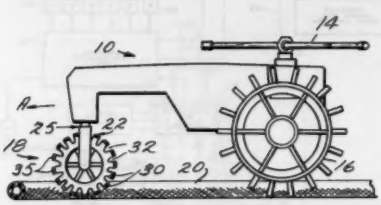
means positioned between said terminating wall of said outlet means and said element for generally spacing said element from said cavity side walls, while normally spacing said element from contact with and at least partial closure of said outlet means for impeding movement of said element towards said outlet means when the water is first caused to flow and for impelling said element away from said outlet means when the water is first caused to cease flowing, for thereby enabling a surging and rapid flow of the water from said cavity means.

4,059,229

TRAVELING SPRINKLER GUIDE WHEEL ASSEMBLY

James R. Pescetto, Peoria, Ill., assignor to L. R. Nelson Corporation, Peoria, Ill.

Filed Apr. 16, 1976, Ser. No. 677,853
Int. Cl.[2] B05B 3/00
U.S. Cl. 239—183 1 Claim



1. A traveling lawn sprinkler comprising a sprinkler body having a water distributing apparatus thereon adapted to be connected with an elongated hose for communicating a supply of water under pressure therewith,

a pair of transversely spaced drive wheels on said sprinkler body for driving said sprinkler body along a lawn to be sprinkled on which the hose is deployed to define a path of driving movement,

a bracket carried by said sprinkler in a transverse position between said drive wheels for pivotal movement about an upright axis,

a horizontally extending shaft carried by said bracket and

a pair of symmetrically-shaped wheel halves carried by said shaft for independent rotational movement with respect to one another about the horizontal axis of said shaft and having complementary exterior peripheries shaped to straddle the hose deployed in the lawn to be sprinkled and to follow the path defined thereby so as to cause the sprinkler body to be guided for driving movement along said path, the improvement which comprises:

each of said pair of wheel halves comprising an annular hub portion adapted to move over a corresponding half of the hose and a marginal periphery having a plurality of annularly spaced slots therein defining a plurality of circumferentially spaced radially extending portions adapted to roll in contact with the lawn to be sprinkled alongside the corresponding half of the hose,

each of said radially extending portions having a tip portion extending axially outwardly therefrom beyond the plane defined by the associated radially extending portion in a direction away from the corresponding hose half so that when the latter constitutes the outer half of a curve in the hose the tip portions will engage beneath the lawn grass and resist upward movement occasioned by the engagement of the other inner wheel half with the curved inside half of the hose.

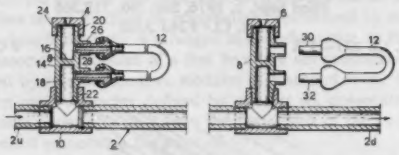
4,059,230

FLUID FLOW CONTROL DEVICE AND FLUID DISTRIBUTION SYSTEM INCLUDING A PLURALITY OF SUCH DEVICES

Peretz Rosenberg, Moshav Beit Shearim, Israel

Continuation of Ser. No. 654,910, Feb. 3, 1976, abandoned. This application Feb. 7, 1977, Ser. No. 766,409
Claims priority, application Israel, Feb. 7, 1975, 46586
Int. Cl.[2] B05B 15/00
U.S. Cl. 239—542 9 Claims

1. A fluid-flow control device, comprising: a fitting including an inlet connectable to a supply line; an outlet connectable to an outlet device; and a flow-deviating member having a first tap establishing communication between said inlet and a first fixed external point on said fitting, a second tap establishing communication between said outlet and a second fixed external point on said fitting, a tube disposed externally of said fitting and connected between said two external points thereof, and means constraining the fluid to flow through said tube from said inlet to said outlet; said tube having a predetermined length, substantially greater than the distance between said



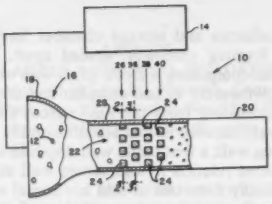
fixed external points on said fitting, to thereby produce a predetermined pressure drop in the fluid flowing therethrough from said inlet to said outlet.

4,059,231

METHOD AND APPARATUS FOR SELECTIVELY COMMINUTING PARTICLES OF A FRANGIBLE MATERIAL

Ernest L. Neu, Redondo Beach, Calif., assignor to Grefco, Inc., Bala Cynwyd, Pa.

Filed July 16, 1976, Ser. No. 705,997
Int. Cl.[2] B02C 19/06
U.S. Cl. 241—5 16 Claims



11. A method for selectively comminuting particles of frangible material being carried by an airconveying system, said method comprising the steps of:

a. accelerating said particles in a substantially linear air stream;

b. classifying said particles within said linear air stream into a plurality of first fractions and second fractions, said first fractions including substantially all particles having a mass greater than a predetermined value, and said second fractions including the rest of said particles, wherein the step of classifying said particles includes the further steps of

i. spacing stationary impact bars each having a substantially flat impact surface in at least one row substantially perpendicular to said air stream, extending each of said bars across substantially an entire width of said air stream, and orienting each of said impact bars with said flat impact surface facing in a direction to oppose the flow in said accelerated air stream;

ii. directing said air stream with said entrained particles toward said impact bars, a pressure head building up on said impact surfaces, and said pressure heads creating adverse pressure fields deflecting particles in said second fractions around said bars;

c. impacting said particles in said first fractions against said stationary impact surfaces, wherein said step of impacting includes the further steps of

i. penetrating said pressure heads with said particles in said first fractions; and

ii. continuing the flow of said particles in said first fractions against said stationary impact surfaces with sufficient particle energy to effect fragmentation; and

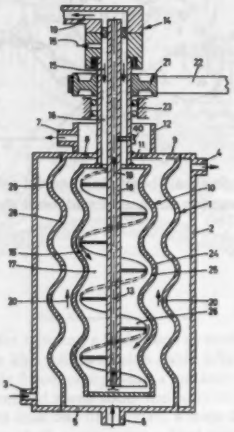
d. re-combining in said linear air stream said impacted and fragmented particles in said first fractions with said bypassed particles in said second fractions.

4,059,232

STIRRING OR AGITATING MILLS

Kaspar Engels, Mannheim, Germany, assignor to Draiswerke GmbH, Mannheim, Germany

Filed Dec. 11, 1975, Ser. No. 639,889
Claims priority, application Germany, Dec. 12, 1974, 2458841
Int. Cl.[2] B02C *23/36*
U.S. Cl. 241—46.17 16 Claims



1. A stirring or agitating mill using grinding bodies, for stirring or grinding material, comprising:

a grinding vessel adapted to be partly filled with the grinding bodies and having an inlet and an outlet for the material to be ground;

an external cooling jacket substantially surrounding said grinding vessel; and

a rotationally drivable, coolable agitator disposed within said grinding vessel,

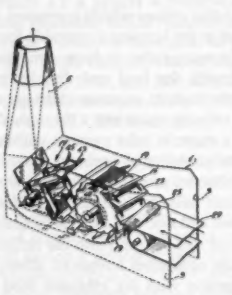
wherein each of the inner wall of said grinding vessel and the outer wall of said agitator is provided with at least one helically extending heat-dissipating projection.

4,059,233

FORAGE HARVESTER

Narcisse Dion, Ste-Therese Ouest, Canada, assignor to B. & R. Choiniere Ltee, Canada

Continuation-in-part of Ser. No. 559,305, March 17, 1975, abandoned. This application Aug. 23, 1976, Ser. No. 716,562
Int. Cl.[2] B02C *9/02, 18/06*
U.S. Cl. 241—47 11 Claims



1. A forage chopping and propelling device comprising, in combination:

a. a casing having an inlet at one end, a discharge chute at the other end and a bottom section that is inclined from the discharge chute to the inlet;

b. means for feeding the forage into the inlet of the casing;

c. a chopper rotor having a first axis of rotation disposed within the casing for chopping the forage fed into the inlet thereof;

d. means disposed between the feeding means and chopper rotor for cooperation with the chopper rotor in chopping the forage;

e. a booster impeller disposed within the casing adjacent the chopper rotor for receiving the chopped forage directly from the chopper rotor and propelling the chopped forage through the discharge chute, said impeller having a second axis of rotation spaced from and parallel to the first axis of rotation to provide rectilinear movement of the forage from the inlet of the casing to the discharge chute; and

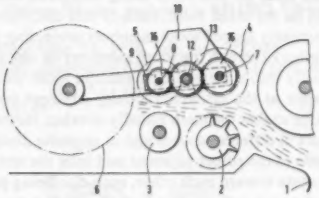
f. at least one recutting bar adjustably mounted to the casing and disposed between the first and second axes of rotation for further cutting the forage chopped by the chopper rotor.

4,059,234

FIELD CHOPPER

Josef Pürrer, Modling, Austria, assignor to Maschinenfabrik Fahr Aktiengesellschaft Gottmadingen, Gottmadingen, Germany

Filed June 22, 1976, Ser. No. 698,493
Claims priority, application Germany, June 27, 1975, 2528829
Int. Cl.[2] B02C *23/02*
U.S. Cl. 241—222 2 Claims



1. A field chopper comprising:

a machine support;

a blade drum rotatably mounted on said support;

crop-intake means on said support forwardly of and spaced from said blade drum for drawing crop material toward said blade drum;

a pair of crop-feed rollers between said crop-intake means and said blade drum for advancing crop material towrds said drum;

a pair of pressing rollers each associated with and disposed above one of said crop-feed rollers for holding crop material thereagainst;

a pair of arms swingably mounted on said support;

respective compensating bars pivotally mounted on said arms for swinging movement about an axis, said pressing rollers being rotatable on said compensating bars on opposite sides of said axis;

a central pinion jounaled on one of said bars for rotation about said axis;

respective pinions on said pressing rollers meshing with said central pinion; and

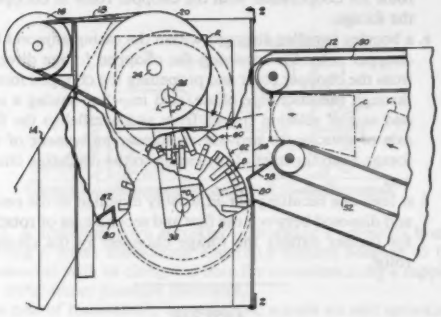
means for releasably mounting the pressing roller proximal to said drum on said bars, said central pinion being driven to rotate said pressing rollers, said central pinion being provided with a shaft traversing said one of said bars and swingably mounting same on a respective one of said arms for pivotal movement about said axis, said one of said arms being formed with a bearing sleeve, said shaft traversing said bearing sleeve.

4,059,235

SHREDDING DEVICE

James G. Bryant, Greencastle, Ind., assignor to Bryant-Poff, Inc., Coatesville, Ind.

Filed May 28, 1976, Ser. No. 690,946
Int. Cl.[2] B02C *18/18, 18/22*
U.S. Cl. 241—223 3 Claims



1. A shredding device comprising means forming a shredding chamber having an inlet lying in a generally vertical plane and an outlet, two rotors journalled in said chamber directly adjacent said inlet on vertically spaced, horizontally extending axes so that a carton entering said chamber through said inlet is immediately engaged by said two rotors, said rotors each comprising a central shaft having a plurality of circular discs fixed thereon at regularly spaced intervals along the axis of the shaft, the discs on one rotor being staggered axially between the discs on the other rotor, each of said discs having a plurality of regularly spaced tooth members projecting radially from the periphery thereof, the tooth members on one rotor projecting radially into the space between the tooth members on the other rotor at the circumferentially adjacent portions of the two rotors so that the teeth radially overlap, means for rotating the rotors at different speeds and in opposite directions so that at the side of the rotors adjacent said inlet the teeth on the two rotors rotate toward each other, each disc being provided with a central opening through which the shaft extends, each disc being secured to its respective shaft by a series of short circumferentially extending arc welds, the successive discs also having a plurality of axially aligned openings therein spaced radially outwardly from said shaft, a rod extending through each row of aligned openings, spacers on said rods between the adjacent discs and means on said rod axially clamping the spacers and discs together.

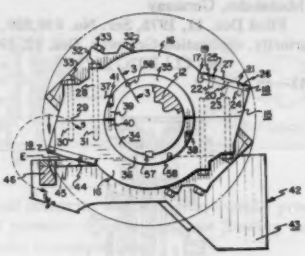
4,059,236

SHEARING STRUCTURE IN MATERIALS REDUCTION MACHINERY

John C. Brewer, Salt Lake City, Utah, assignor to Garbalizer Corporation of America, Salt Lake City, Utah

Filed Dec. 6, 1976, Ser. No. 747,482
Int. Cl.[2] B02C *18/06*
U.S. Cl. 241—243 1 Claim

1. In combination, an anvil structure provided with blade travel passageways comprising elongate, rectilinear, mutually parallel slots terminating in outer extremity apexes, a shaft, and plural blades mounted upon said shaft, registered with said passageways for travel therethrough, and having elongate shearing portions aligned with and entering said slots and provided with apex-configured ends registering with said passageways proximate said slot extremity apexes, and wherein said anvil structure has an upper reaction surface, said blades having elongate shearing portions constructed to pass in angulated, scissor-type shear, beginning nearest said shaft, relative to said upper reaction surface of said anvil structure.

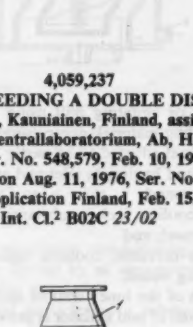


4,059,237

SYSTEM FOR FEEDING A DOUBLE DISC REFINER

Bo Knut Mannstrom, Kauniainen, Finland, assignor to Oy Keskuslaboratorio - Centrallaboratorium, Ab, Helsinki, Finland

Continuation of Ser. No. 548,579, Feb. 10, 1975, abandoned.
This application Aug. 11, 1976, Ser. No. 713,427
Claims priority, application Finland, Feb. 15, 1974, 74452
Int. Cl.[2] B02C *23/02*
U.S. Cl. 241—246 14 Claims



1. In a double disc refiner which comprises a housing with an exit opening and in the housing a rotatable feed end disc spaced from a rotatable second disc to form a refining space between said discs and with the feed end disc having a plurality of openings therethrough to accommodate passage of wood materials into the refining space and a drive shaft for rotating said feed end disc, a material inlet passage within the housing and connected to the plurality of openings in the feed end disc and material feed channel means for feeding the wood materials through the inlet passage from an end of said inlet passage opposite the feed end disc and into the plurality of openings in the rotatable feed end disc and into the refining space wherein the improvement comprises a separate steam removal channel in direct connection with the rotatable feed end disc and the plurality of openings in said feed end disc by way of said inlet passage, said steam removal channel being connected to said inlet passage and located à spaced distance from said material feed channel means for feeding the wood materials.

4,059,238

MACHINE FOR WINDING CONTAINERS

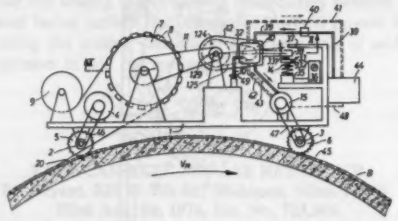
Kurt Vogt, Beinwil am See, Switzerland

Continuation-in-part of Ser. No. 505,872, Sept. 13, 1974, abandoned, which is a continuation of Ser. No. 288,238, Sept. 11, 1972, abandoned. This application Sept. 11, 1975, Ser. No. 612,506

Claims priority, application Switzerland, Mar. 13, 1972, 3617/72

Int. Cl.² B21F *17/00*

U.S. Cl. 242—7.21 15 Claims



1. A machine for winding a body such as containers, tubular members and the like with a tension cable which is tensioned with an adjustable force, comprising a machine carriage movable at a predetermined speed about the body to be wound, said carriage having at least one drive shaft, a main drive motor for driving said drive shaft, a clamping wheel mounted for rotation on said carriage for tensioning the cable, and a mechanism for maintaining substantially constant the force in the cable, said mechanism incorporating braking means driven by said clamping wheel and mounted to pivot in one direction about a fixed pivot axis upon being driven by said clamping wheel, at least one auxiliary motor for auxiliary drive of said carriage, said braking means being connected to said at least one auxiliary motor to transmit the energy taken-up during braking from said braking means to said at least one auxiliary motor, a spring resisting pivotal movement of said braking means in said one direction about said fixed pivot axis whereby said braking means assume a pivotal position about the pivot axis dependent on the rotational moment transmitted to said braking means by said clamping wheel, and control means for regulating as a function of the pivotal position of the braking means about the pivot axis the energy transmitted from said braking means to said at least one auxiliary motor so as to change the relationship of the speed of the machine carriage to the rotational speed of the clamping wheel in such a manner that the force in the tension cable strives to approach a desired value.

4,059,239

METHOD AND APPARATUS FOR WINDING A THREAD ON A BOBBIN AT A HIGH WINDING SPEED

Kikuo Hori; Takumi Horiuchi; Mikio Nishikawa; Shiro Ryugo; Akira Ishizuka, and Yoshisuke Takenaka, all of Matsuyama, Japan, assignors to Teijin Limited, Osaka, Japan

Filed Nov. 3, 1975, Ser. No. 628,152

Claims priority, application Japan, Nov. 6, 1974, 49-127814

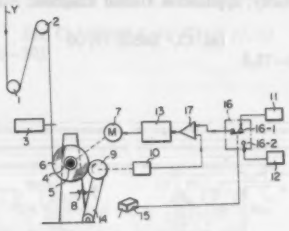
Int. Cl.² B65H *54/38*

U.S. Cl. 242—18.1 18 Claims

1. In an operation for winding a synthetic thread on a cylindrical bobbin for producing a full size yarn package at a winding speed of more than 2500 m/min. an improvement comprising increasing the tightness of winding said thread on previously formed thread layers of said yarn package in at least one stepwise increment during a period of said winding operation when $1.20\times10^{-6}\leqq(dw/dt)/D\leqq3.0\times10^{-6}$, wherein w represents number of bobbin rotations per one reciprocal traverse motion, t represents time in minutes, and D represents the thickness of said thread in denier.

6. In a winding apparatus for winding a synthetic thread on a cylindrical bobbin for producing a full size yarn package, the apparatus including a traverse motion mechanism and a take-up device, an improvement comprising,

means for producing a stepwise increase in the winding tightness of said thread on a previously formed thread layer of said yarn package and



means for actuating said means for producing a stepwise increase in the winding tightness at least once during a period of said winding operation when $1.20\times10^{-6}\leqq(dw/dt)/D\leqq3.0\times10^{-6}$, wherein w represents number of bobbin rotations per one reciprocal traverse motion, t represents time in minutes, and D represents the thickness of said thread in denier.

4,059,240

THREAD STORAGE AND SUPPLY DEVICE

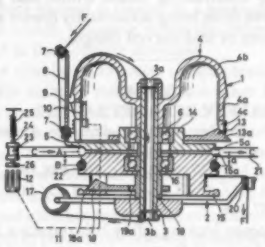
Ove Laursen, Dalum, Sweden, assignor to AB IRO, Ulricehamn, Sweden

Filed Sept. 13, 1976, Ser. No. 722,963

Claims priority, application Germany, Sept. 12, 1975, 2540746

Int. Cl.² B65H *51/20*

U.S. Cl. 242—47.01 11 Claims



1. In a thread storage and supply device, preferably for textile machines, having first storage means for positive thread supply preceded by second storage means for intermittent thread supply, comprising the improvement wherein the second storage means has a stationary storage drum provided with a hollow shaft and onto which a thread issuing from a thread supply can be wound by a winding element which can be driven to rotate coaxially of the stationary storage drum in order to form an intermediate thread supply thereon, and from which the thread can be removed from this intermediate thread supply over the end of the stationary storage drum and through the hollow shaft, wherein said first storage means has a thread drum which can be rotatably driven and upon which the thread issuing from the stationary storage drum can be wound tangentially and from which it can be unwound tangentially at an unwinding speed equal to the winding speed, the rotatable thread drum being located on an extension of the hollow shaft, and the stationary storage drum with its thread supply area being located closely adjacent the thread drum.

4,059,241

AIR FLOTATION TURNER BAR

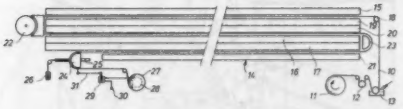
Joseph Irma De Roeck, St. Katelijne-Waver, and Francois Jean Pira, Edegem, both of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

Filed Nov. 27, 1974, Ser. No. 527,521

Claims priority, application United Kingdom, Nov. 29, 1973, 55390/73

Int. Cl.² B65H *59/00*

U.S. Cl. 242—75.5 **8 Claims**



1. A turner device for providing support for a travelling web within a zone along its path where it undergoes an arcuately curved directional change, said device comprising means defining an air plenum including two opposed spaced apart generally solid side walls extending perpendicularly to the plane of the web in adjacent spaced relation to the extreme web edges, opposed arcuately curved flanges each formed integrally with one such side wall and projecting inwardly therefrom for underlying limited overlapping relation with the corresponding marginal strips of the web passing between the planes of said side walls, said flanges being coaxially arranged with their curvature corresponding to the curvature of the web directional change, the mutually facing edges of said flanges being spaced apart a distance equal to the transverse width of said web less said marginal strips and the intervening space being substantially open and unobstructed to leave the web substantially unsupported in said intervening space, means for supplying air to said plenum under pressure sufficient to provide during travel of the web an air cushion below the curved web portion to support the web while undergoing said directional change, and web constraining means within said plenum for preventing the web from being accidentally drawn as far as the center of curvature of said curved flanges.

4,059,242

SAFETY BELT RETRACTOR

Akira Tanaka, Northridge, Calif., assignor to American Safety Equipment Corporation, Encino, Calif.

Filed May 20, 1976, Ser. No. 688,188

Int. Cl.² A62B *35/02*; B65H *75/48*

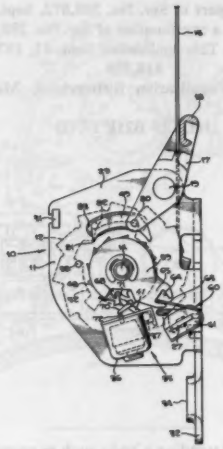
U.S. Cl. 242—107.4 A **8 Claims**

1. In an emergency locking safety belt retractor including a belt storage reel having at least one associated locking ratchet, locking pawl means for engaging said ratchet to lock said reel against belt unwinding movement and emergency sensing means including a movable actuator movable in response to an emergency condition, the improvement comprising the provision of:

actuating pawl means associated with said emergency sensing means for movement from a first to a second position in response to movement of said actuator produced by said emergency sensing means in an emergency condition warranting reel lockup;

drive means driven off of reel rotation for engaging said actuating pawl means when the latter is in said second position, said drive means then driving said actuating pawl means toward a third position; and

an intermediate actuating member and means for movably mounting it operably between said actuating pawl means and said locking pawl means for moving the latter into reel locking engagement with said ratchet on movement of said actuating pawl means under the action of said drive means from said third position wherein it engages said intermediate actuating member to a fourth position wherein it has moved said intermediate actuating member



to a position wherein the latter has caused said locking pawl means to engage said ratchet to lock said reel.

4,059,243

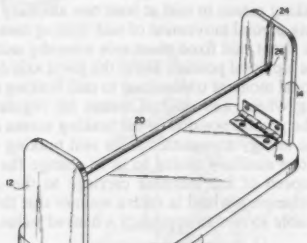
SKEIN DISPENSER

Kenneth H. Hartley, 1206 W. Main St., Williamston, N.C. 27892

Filed Apr. 14, 1976, Ser. No. 676,954

Int. Cl.² B65H *49/00*

U.S. Cl. 242—129.6 **1 Claim**



1. A device for holding and dispensing a skein of textile material such as yarn or the like, comprising in combination

a. a base member having a generally planar and rectangular configuration,

b. two spaced apart planar and generally rectangular end members positioned adjacent opposite ends of said base member and which in their operative positions are parallel to each other and perpendicular to said base member,

c. two spaced apart hinge members, one hinge member connecting one end member to the upper surface of said base member and the other hinge member connecting the other end member to the upper surface of said base member, said hinge members interconnecting said end members to said base member in such a way that the end members can pivot toward and away from each other through an angle of approximately 90°,

d. rod seating means located in both of said end members in

the sides of the end members that face each other when the end members are in their operative position,

e. an elongated rod member extending between said end members when the end members are in their upright operative position, the ends of said rod member being seated in said rod seating means so that the rod member is disposed essentially parallel to said base member and spaced thereabove, said rod member being adapted to hold a skein of textile material, and

f. an elongated vertical groove in the facing surface of one of said end members, said elongated vertical groove extending between the upper periphery of said end member and the rod seating means located immediately beneath it on said facing surface, said elongated vertical groove facilitating the seating and unseating of one end of said rod member in said rod seating means.

4,059,244

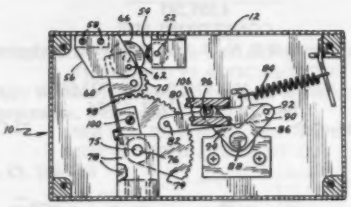
TAPE CASSETTE PHRASE RETRIEVER

Noel M. Payant, 325 W. 5th St., Shakopee, Minn. 55379

Filed Aug. 19, 1976, Ser. No. 715,906

Int. Cl.² G03B *1/04*; G11B *15/32, 23/04*

U.S. Cl. 242—200 **9 Claims**



1. A tape cassette phrase retriever for use with a tape cassette playback machine and a tape cassette in which tape cassette, tape containing intelligence is entrained on a forward tape takeup reel and a reverse tape takeup reel, the reverse tape takeup reel having sprocket means which, when rotated in a first direction, will cause the tape to be wound from the forward tape takeup reel onto the reverse tape takeup reel and in which the tape cassette playback machine has means for receiving said cassette, means for driving said tape from said reverse tape takeup reel towards forward tape takeup reel, means for playing out the intelligence on said tape as it moves from said reverse takeup reel to said forward takeup reel, and means for stopping said tape drive means when a phrase on said tape to be repeated has just been played out by said machine; said tape cassette phrase retriever including:

A. a case having an outer face plate, and means cooperating with said cassette playback machine and cassette for fixedly positioning said case with respect to the cassette and playback machine;

B. pinion means rotatably mounted with respect to said case and extending outwardly therefrom in position to be in operative driving relationship to said cassette reverse reel sprocket means so that rotation of said pinion means in a first direction will cause said sprocket means to rotate in said first direction to cause tape to be wound from said forward reel onto said reverse reel;

C. manually operable means mounted with respect to said retriever case for positively rotating said retriever pinion means in said first direction; and

D. means to limit the amount of movement of said manually operable means to the end that precisely the proper length of tape will be retrieved onto the reverse tape takeup reel to cause a phrase which is to be repeated to be played back beginning specifically with the start of such phrase.

4,059,245

MAGNETIC RECORDING-REPRODUCING DEVICE

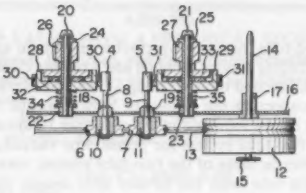
Huminori Hirose, Hirakata, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Japan

Filed May 17, 1976, Ser. No. 686,830

Claims priority, application Japan, May 20, 1975, 50-60795; May 20, 1975, 50-60796; June 2, 1975, 50-66820; June 2, 1975, 50-66821

Int. Cl.² G03B *1/04*; G11B *15/32*

U.S. Cl. 242—201 **3 Claims**



1. A magnetic recording and reproducing apparatus comprising:

a reversible motor;

first and second rotatable reel shafts upon which corresponding reels containing a magnetic recording medium may be disposed;

a capstan shaft for transporting said medium at a constant speed;

first and second one-way rotary clutches each having an inner race and an outer race, one race of said first clutch being coupled for rotation with said first reel shaft, one race of said second clutch being coupled for rotation with said second reel shaft, said first clutch engaging when the other race thereof is rotated in a given direction and said second clutch engaging when the other race thereof is rotated in the opposite direction

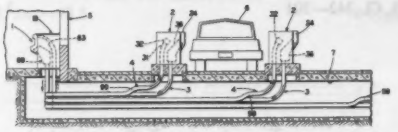
means for coupling said motor to said capstan and said other races for rotation therewith, said other races rotating in said given direction to drive said first reel shaft through said first clutch when said motor is driven in one direction, said other races rotating in said opposite direction to drive said second reel shaft through said second clutch when the driving direction of said motor is reversed;

each of said clutches having the inner and outer race thereof disposed in coaxial relationship to define an annular space therebetween, a plurality of regularly angularly spaced apart spring members integrally formed with one of said inner and outer races thereof and radially extending into said annular space to define a corresponding plurality of cages in said annular space, the portions of the peripheral surfaces of said races forming walls of each cage converging toward each other adjacent a spring member at the end of the cage corresponding to a first rotational direction to form a roller engaging region, and diverging from each other adjacent another spring member at the other end of the cage corresponding to the opposite rotational direction to form a roller idling region, and a spherical or cylindrical roller disposed in each cage and having a diameter greater than the distance between said races in said roller engaging region and less than the distance between said races in said roller idling region, whereby said clutch is engaged when the races thereof are rotated to drive said rollers into said engaging regions, and said clutch is disengaged when the races thereof are rotated to drive said rollers into said idling regions.

4,059,246
PNEUMATIC TUBE BANKING SYSTEM

Walter G. Anders; Michael A. Cole; James C. Duncan, and Paul A. Leipelt, all of Canton, Ohio, assignors to Diebold, Incorporated, Canton, Ohio

Filed Sept. 8, 1976, Ser. No. 721,552
Int. Cl.[2] B65G *51/34*
U.S. Cl. 243—7 6 Claims



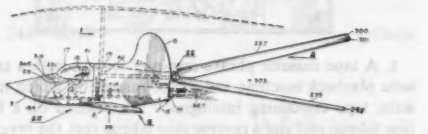
1. A two-tube, non-captive carrier pneumatic tube banking system including a teller terminal and a remote customer terminal; first and second tubes forming a two-tube carrier conveyor systems connecting the terminals; blower means having inlet and outlet means mounted in the customer terminal supplying air to the two-tube system for pressure or vacuum movement of the carrier in tubes of the two-tube system; means connecting the first tube with the blower inlet means; the first tube acting as a carrier-receive tube for the customer terminal; means connecting the second tube with the blower output means; the second tube acting as a send tube for the customer terminal; the blower thereby supplying air under vacuum at the customer terminal to the first tube and air under pressure at the customer terminal to the second tube; muffler means mounted in line each with the means connecting the first and second tubes with the blower inlet and outlet means respectively to reduce noise emanating from air currents passing through the system; the first and second tubes having ends at the customer terminal; first blower control means for stopping blower means operation mounted adjacent the first tube customer terminal end; second blower control means for starting blower means operation mounted adjacent the second tube customer terminal end; said first blower control means being actuated by a carrier discharged from said first tube customer terminal end to stop blower means operation; said second blower control means being actuated by a carrier delivered to the second tube customer terminal end to start blower means operation; valve housing means mounted in the customer terminal surrounding the first tube customer terminal end; there being a carrier arrival opening formed in the valve housing; valve means pivotally mounted in the customer terminal normally closing said arrival opening; said first blower control means being mounted on the valve housing means; movement of the valve means when the valve means is engaged by a carrier discharged from said first tube customer terminal end actuating said first blower control means; means connecting the valve housing and the first tube customer terminal end with the muffler means that is connected with the blower inlet; the customer terminal arrival opening valve means including flexible flap means; the flexible flap means having a main flap member and a secondary flap member; the main flap member being pivotally mounted in the customer terminal; the secondary flap member being pivotally mounted on the valve housing; the flexible flap means members being moved by a carrier discharged from said first tube customer terminal end to open position and falling by gravity thereafter to closed position; and said valve means actuation of said first blower control means occurring during movement of the secondary flap member to open position when engaged by a carrier discharged from said first tube customer terminal end, thereby stopping blower means operation.

6. A two-tube, non-captive carrier pneumatic tube banking system including a teller terminal and a remote customer terminal; first and second tubes forming a two-tube carrier conveyor system connecting the terminals; blower means having inlet and outlet means mounted in the customer terminal supplying air to the two-tube system for pressure or vacuum movement of the carrier in tubes of the two-tube system; means connecting the first tube with the blower inlet means; the first tube acting as a carrier-receive tube for the customer terminal; means connecting the second tube with the blower outlet means; the second tube acting as a send tube for the customer terminal; the blower thereby supplying air vacuum at the customer terminal to the first tube and air under pressure at the customer terminal to the second tube; first and second muffler means mounted in line respectively with the means connecting the first and second tubes with the blower inlet and outlet means to reduce noise emanating from air currents passing through the system; the first and second tubes having tube ends at the teller terminal; arrival station means having a discharge opening mounted in the teller terminal; third muffler means mounted in the teller terminal connecting the arrival station means with the second tube teller terminal end; dispatch station means mounted in the teller terminal; means connecting the dispatch station means with the first tube teller terminal end; the third muffler means includes an inner perforate tube section, foam air-current noise reducing means surrounding the inner perforate tube section, the plastic sleeve means surrounding and enclosing the foam means; and a carrier arriving at the teller terminal moving from the second tube teller terminal end through the third muffler means inner perforate tube section and then into the arrival station means connected with the third muffler means.

4,059,247
CONVERTIBLADE

Richard H. Prewitt, R.R. No. 3. 3585 Paris Pike, Lexington, Ky. 40511

Filed Sept. 15, 1976, Ser. No. 723,661
Int. Cl.[2] B64C *27/02, 27/26*
U.S. Cl. 244—7 R 22 Claims



21. In an aircraft, an airframe, pitch controlled blades, support means to rotatably support said blades on said airframe, means to move said blades from an autogiro configuration to an airplane configuration and vice versa, means to change the pitch of said blades, and means responsive to said blades being moved from the airplane configuration to shift said pitch change means from one of the pilot's controls to another.

4,059,248
SHELF SUPPORT BRACKET FOR MOUNTING ON RAILINGS AND THE LIKE

Gregg R. Kuntz, 1005 E. La Veta, Orange, Calif. 92666

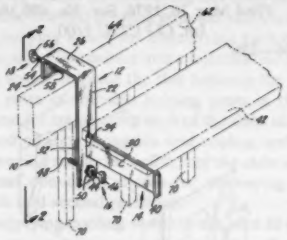
Filed July 30, 1976, Ser. No. 710,258
Int. Cl.[2] E04G *3/00*
U.S. Cl. 248—214 5 Claims

1. A shelf support bracket for mounting onto railings or the like, which comprises:

a. a one piece railing attaching member formed in a general inverted U-shape adapted for fitting downwardly over a railing or the like and including first and second rigid legs of unequal lengths from a rigid transverse segment, said first leg being substantially shorter than said second leg, said second leg having mounted thereto rail clamping means adapted both for accommodating the member to railings narrower than the length of the transverse segment and for clamping the member to the railing.

b. an elongate rigid shelf supporting member fixed to said first leg below the lower end of the second leg and projecting generally perpendicularly therto and away from the second leg,

c. adjusting means mounted on the first leg for enabling leveling of the shelf supporting member,
said adjusting means including a manually movable element having an inner end portion adapted to engage a member or surface supporting the railing upon which the bracket is mounted, and



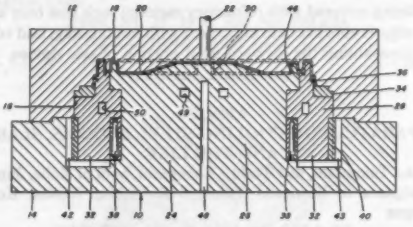
d. shelf stop including an elastomeric ring slidingly installed over said shelf supporting member and positioned to engage an outer edge of a shelf supported by the bracket, positioning of the ring on the shelf supporting member corresponding to the width of the shelf.

4,059,249

INJECTION MOLD FOR MOLDING INTERNALLY THREADED PLASTIC ARTICLE

Herbert W. Galer, Newnan, Ga., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed Dec. 30, 1976, Ser. No. 755,512
Int. Cl.² B29D *15/00*; B29F *1/14*
U.S. Cl. 249—58 **2 Claims**



1. Apparatus for the injection molding of plastic articles having a threaded hollow therein, including means for the ready release of said article when the plastic has been set, said apparatus including,

a. a housing having a cavity therein, said cavity being formed by matable upper housing and lower housing elements which provide a substantially liquid tight enclosure at the matable surfaces thereof, said upper housing element having (i) a sprue therein for the admission of plastic feed into the cavity, (ii) an approximately planar central bottom surface serving as the boundary forming the central part of the top surface of said article, and (iii) a rim bottom surface serving as the boundary forming the rim part of the top surface of said article,

b. said lower housing element having a cylindrical core member fixably connected thereto, said core member having a top surface the vertical axis of said core member intersecting the midpoint of said upper housing element central bottom surface, the top surface of the core member serving as the boundary forming a central part of the bottom surface of said article, said core member top surface having a horizontally disposed, rod-like protrusion (i) affixed thereto, perpendicular to the core vertical axis and (ii) lying approximately within the bounds of said upper housing element central bottom surface, said rod-like protrusion acting to form a handle-like portion of said article,

c. contiguous to and surrounding circular portion of the core member, an annular element journaled for rotation about the core member, at least a portion of the top surface of said annular element serving as the boundary forming the rim portion of the bottom surface of said article; the vertical, outer surface of said annular element (i) serving as the boundary forming a vertical portion of the hollow of said article, and (ii) having depressions therein acting to form the threads of the hollow,

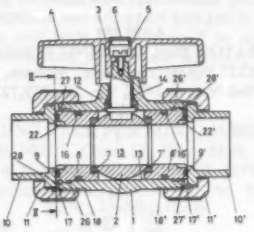
d. means for rotating said annular member.

4,059,250

STOP VALVE WITH A SPHERICAL STOPCOCK

Erich Guldener, Uhwiesen, and Paul Trösch, Schaffhausen, both of Switzerland, assignors to Georg Fischer Aktiengesellschaft, Schaffhausen, Germany

Filed Dec. 19, 1975, Ser. No. 642,385
Claims priority, application Switzerland, Dec. 24, 1974, 17262/74
Int. Cl.² F16K *5/00*
U.S. Cl. 251—304 **4 Claims**



1. A stop valve comprising:

a housing having two ends with a continuous cylindrical bore extending between the ends;

a connecting sleeve positioned at and located outwardly of each housing end;

coupling-nut means for connecting said connecting sleeves to said housing, said coupling-nut means being displaceably attachable to said housing and slidably displaceable along said connecting sleeve,

a stopcock disposed in the bore in said housing and spaced from the ends thereof;

two sealing rings located within said bore one on each side of said stopcock, each of said sealing rings being arranged to contact said stopcock on an annular part of the sealing ring surface;

a shaft coupled to said stopcock and extending transversely of the cylindrical bore in said housing;

two axially extending insert rings located within and in coaxial relation with said bore one on each side of said stopcock and in contact with another annular part of the surface of the adjacent said sealing ring spaced from the annular part in contact with said stopcock, said insert rings having a coaxial length so that in combination with said sealing rings and said stopcock the axial dimension of the combination is greater than the axial length between the ends of said housing with the ends of said insert rings spaced outwardly from said sealing rings extending outwardly from the ends of said housing and disposed in displaceable contact with the adjacent said connecting sleeve and said connecting sleeves being in axially spaced relation to the adjacent end of said housing said insert rings being in slidable and rotatable engaging contact with the surface of the bore in said housing, uniformly angularly spaced recesses formed in said housing at each end

thereof and opening into said bore, an annular groove formed in said bore adjacent each end thereof and each said recess opening into the adjacent said annular groove, lips formed on the bore at each end of said housing and extending radially inwardly toward the axis of said bore with each lip extending between a pair of said recesses;

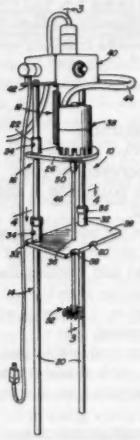
uniformly angularly spaced guide-type dogs formed on the radially outer surface of each of said insert rings adjacent and spaced from the opposite end thereof from said sealing ring, each of said insert rings being axially slidable into said bore from an opposite end of said housing and each said guide-type dog being slidable through one of said recesses into said annular groove and being rotatable with said insert ring through said annular groove into position behind one of said lips for retaining said insert ring within said housing, and each of said insert rings with said guide dogs thereon being axially displaceable within the corresponding said annular groove, whereby said insert rings are retained in said housing when said coupling-nut means are displaced from attachment on said housing, said housing and insert rings being radially displaceable relative to the axis of the housing bore from said connecting sleeves and said sealing rings being adjustable from the extension of said stop valve without requiring disassembly of said stop valve and without causing axial displacement of said stopcock.

4,059,251

AGITATOR FOR MELTING FURNACE

Paul Huzyak, 1227 Pennsylvania Ave., Monaca, Pa. 15061

Filed Nov. 4, 1976, Ser. No. 739,721
Int. Cl.² C22B *9/00*
U.S. Cl. 266—235 **6 Claims**



1. An agitator assembly for use with a melting furnace, comprising, in combination:

a. a support arrangement disposed extending from a melting furnace whose contents are to be agitated:

b. a motor mount disposed on the support arrangement for movement toward and away from the furnace;

c. agitator means mounted on the motor mount for movement therewith and selectively insertable into the furnace for agitating the contents thereof;

d. clamp means provided on the motor mount for releasably engaging the support arrangement and retaining the motor mount at a desired location on the support arrangement; and

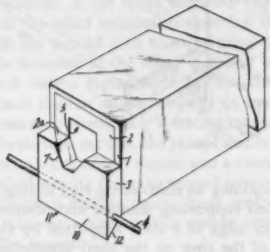
e. a cover mounted on the support arrangement for movement toward and away from the furnace independently of the motor mount for selectively covering an intake opening of the furnace and preventing splash of the contents of the furnace during agitation of the contents by the agitator means.

4,059,252

SLAG TAP

John Erling Anderson, Katonah, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Filed May 26, 1976, Ser. No. 690,186
Int. Cl.² C21C *1/00*
U.S. Cl. 266—236 **5 Claims**



1. A device for tapping molten slag comprising:

a. a refractory lined metal duct provided with cooling means, said duct having an inlet port at one end, and a discharge port at the other end, the lower portion of the face of the discharge port being sealed against the leakage of molten slag by being abutted against

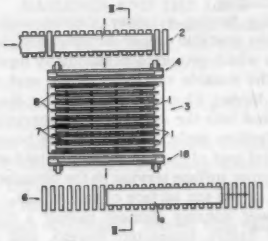
b. a highly heat-conductive, water-cooled metal weir, said weir having a surface sloped up and away from the face of said discharge port and terminating in an edge which extends across the face of said discharge port, said surface being covered with refractory material such that only said edge is able to come in contact with molten slag, said edge constituting the forward most portion of said device.

4,059,253

APPARATUS FOR COOLING STEEL BLOOMS, SLABS, AND THE LIKE

Yutaka Takahashi, and Toshiji Kobayashi, both of Kobe, Japan, assignors to Kawasaki Yukogyo Kabushiki Kaisha, Kobe, Japan

Filed May 18, 1976, Ser. No. 687,604
Claims priority, application Japan, May 22, 1975, 50-61572
Int. Cl.² C21D *1/62*
U.S. Cl. 266—259 **5 Claims**



1. A steel slab cooling apparatus comprising:

a base floor structure;

a plurality of vertical cooling walls erected on said floor structure in mutually parallel and spaced arrangement to form a slab-receiving space between adjacent cooling walls, each of said cooling walls having an inlet and an

outlet and including means for passage of cooling water therethrough from said inlet to said outlet;

upright slab holding posts fixedly mounted on said floor structure in each of said slab receiving spaces, said posts in each slab receiving space being disposed in two parallel rows parallel to said cooling walls to position and hold a steel slab in upright position between the rows;

first conveying means for conveying hot steel slabs at high temperature to a first position adjacent said cooling walls;

lifting and carrying means for transferring each of the steel slabs from said first position into a selected one of said slab receiving spaces to place the slab between the respective said two rows of the slab holding posts in the upright position and for transferring each of the slabs after cooling to a second position alongside said cooling walls;

second conveying means for conveying the slabs away from said second conveying means for conveying the slabs away from said second position;

means for supplying cooling water to the inlet of each cooling wall;

means for conducting from the outlet of each cooling wall a mixture of hot water and steam produced in each of said cooling walls by heat absorbed by the cooling water by radiation of heat from the hot steel slabs; and

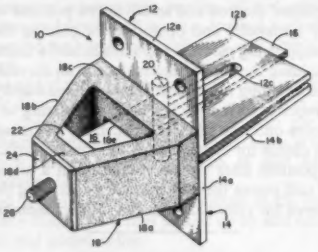
a steam drum connected to the conducting means for receiving the mixture of hot water and steam from said conducting means and sending the steam to means for utilizing recovered heat.

4,059,254

ENERGY ABSORBING UNIT

George Samuel Fielding-Russel, and Alan N. Gent, both of Stow, Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Oct. 28, 1976, Ser. No. 736,618
Int. Cl.[2] B60R *19/08*; F16F *7/12*
U.S. Cl. 267—140 6 Claims



1. An energy absorber comprising:

A. an elastomeric member having forward and rearward ends interconnected by inclined columns terminating in a base member at its rearward end and in an apex member at its forward end;

B. a piston attached to the apex member and slidably received through the base member, extending rearwardly of the base member;

C. mounting means positioned to abut the base of the elastomer member for receiving the rearwardly extending portion of the piston such that the piston is restricted to motion in a substantially horizontal plane; and

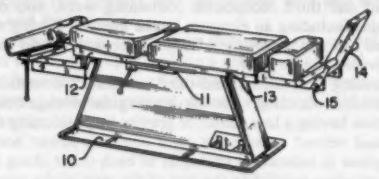
D. pin means fastened to the piston in a manner to limit its forward horizontal excursion by reason of the pin's interaction with the mounting means while also providing a pivot for the piston during an angular excursion in the horizontal plane.

4,059,255

ADJUSTABLE TABLE FOR PHYSICAL THERAPY

Helmuth Conny Perold, Reseda, Calif., assignor to Adjusting Tables Inc., N. Hollywood, Calif.

Filed June 9, 1977, Ser. No. 804,886
Int. Cl.[2] A61G *13/00*
U.S. Cl. 269—323 7 Claims



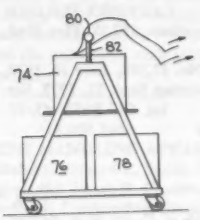
1. An adjustable table movable between a first normal position to a second raised position and between said first normal position and a third tilted position; a foot rest on said table movable between a folded out-of-the-way position and an extended usable position; and an intercoupling means between said foot rest and said table such that when said foot rest is in said folded out of the way position said table is constrained to movement only between said first normal position and said second raised position and when said foot rest is in its extended usable position said table is constrained to movement only between said first normal position and said third tilted position.

4,059,256

LOADING RACK FOR MINICOMPUTER

Sherwin Palmer, 3401 E. Court St., Flint, Mich. 48501

Continuation of Ser. No. 598,279, July 23, 1975, abandoned.
This application July 6, 1976, Ser. No. 703,019
Int. Cl.[2] B65H *39/00*
U.S. Cl. 270—52 3 Claims



1. In combination:

a business machine including an elongate web intake member having a longitudinal axis, and means for advancing multiple ply, prefolded web to said machine, said machine including means for printing data onto the multiple ply, prefolded web; and rack means providing a generally triangular storage web configuration for feeding multiple ply, prefolded web between a plurality of sources of multiple ply, prefolded web and said machine, including a pair of A-shaped frame members supporting first and second planar, horizontal shelves, said first shelf having a first width and supporting first and second receptacles containing multiple ply, prefolded web, said first and second receptacles substantially abutting each other along a vertical plane parallel to the axis of the web intake member of said business machine; said second shelf having a second width that is less than said first width and located above said first shelf at a height sufficient to permit fan out of the multiple ply, prefolded web from said first and second receptacles, said second shelf supporting a third receptacle containing multiple ply, prefolded web symmetrically about said vertical plane; and a horizontal member attached to said rack means, said member being spaced apart

from said second shelf and having a body portion for separating individual plies of multiple ply, prefolded web from each other by passing the individual plies past opposite sides of the body portion while guiding said multiple ply, prefolded webs from each of the three receptacles to the intake member of said business machine.

3. A method of successively supplying prefolded recording web without obstruction to a business machine from first, second and third receptacles containing webs, said business machine including an elongate intake member having a longitudinal axis and means for advancing the web to said machine, comprising the steps of:

orienting first, second and third receptacles containing prefolded recording webs into a triangular storage configuration having a low center of gravity by positioning the first and second receptacles on a common lower horizontal plane in substantial abutment to each other along a vertical plane parallel to the axis of the web intake member of said machine, and with said second receptacle substantially abutting said machine, and positioning the third receptacle containing prefolded recording web on an upper horizontal plane and substantially symmetrically about said vertical plane above said first and second receptacles at a height sufficient to permit unobstructed fan out of the prefolded webs from said first and second receptacles to said machine; and

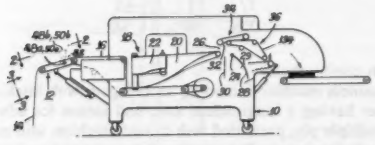
feeding the prefolded webs successively from said first, second and third receptacles along unobstructed flow paths to the web intake member of said machine, including feeding the prefolded recording web from said first receptacle to said intake member along a first path passing between said upper and lower horizontal planes with only said web from said first receptacle passing through said vertical plane and over a full width of said second receptacle, and feeding the prefolded recording web from said second receptacle to said intake member along a second path between said upper and lower horizontal planes.

4,059,257

LAUNDRY FOLDER

Frederick W. Grantham, 152 W. Pico Blvd., Los Angeles, Calif. 90015

Division of Ser. No. 47,188, June 18, 1970, Pat. No. 3,920,237.
This application Sept. 23, 1975, Ser. No. 615,925
Int. Cl.[2] B65H *45/22*
U.S. Cl. 270—66 **16 Claims**



1. In a laundry folder including conveyor means for receiving laundry pieces at an entrance end and carrying them through the folder and folding them and placing them on a supporting means at an exit end, and in which the conveyor means includes a feedboard at the entrance end on which the laundry pieces are placed, the feedboard including a belt member means forming a segment of the conveyor means, the conveyor means being so positioned and arranged for most effectively conveying the laundry pieces when they are placed on the feedboard in a transversely central position, the combination comprising:

means responsive to the position of a laundry piece on the feedboard out of its said transversely central position for shifting it into its said transversely central position, whereby the piece then is conveyed in such position by the conveyor means through the folder,

folding means including a french folder which includes a pair of main folding blades and a pair of auxiliary folding blades associated therewith, each pair having outside and inside edges, the main folding blades extending longitudinally and being spaced apart laterally, the pair of auxiliary folding blades being mounted on the main folding blades and extending generally longitudinally and pivoted for movement between an inner position in which their outer edges are coincident with the outer edges of the main folding blades and an outer position in which their outer edges diverge in direction along the line of progress of the pieces being folded, means for moving the auxiliary blades between their inner and outer positions, and means controlled by the movement of the piece being folded along the main folding blades for actuating the means for moving the auxiliary folding blades to their inner position at a predetermined point in the progress of the piece being folded along the french folding means whereby a portion of the piece is spread widely and the remainder of the piece is spread less widely, means for stacking folded pieces including a final supporting surface at the exit end of the folder, a wicket for receiving the pieces conveyed through the folder and movable for placing the pieces on a supporting surface, the supporting surface being vertically movable, clutch means for supporting the supporting surface normally in a fixed position but yieldable in response to predetermined pressure applied to the supporting surface for enabling it to be lowered by an extent in proportion to the pressure so applied, and operative for maintaining the supporting surface at each new position as thus moved, means for raising the supporting surface, and means responsive to the pieces being stacked to a predetermined extent on the supporting surface for actuating the means for raising the supporting surface.

11. A laundry folder having an entrance end and an exit end and conveyor means for receiving a piece to be folded and conveying it through the folder and including means for folding the piece in its progress through the folder, comprising a supporting member for receiving the folded pieces as delivered through the exit end, the folder also including wicket means for receiving the folded pieces and placing them on the supporting member, the wicket means including a transverse shaft and a plurality of rods movable between a retracted position adjacent the conveyor means in which the folded laundry pieces are placed thereon and an advanced position in which it is generally horizontal and operative for placing the laundry piece on a supporting member top surface, and a friction clutch normally holding the supporting surface in an elevated starting position and enabling movement thereof downwardly in increments in response to the wicket means operating to stack the laundry pieces onto the supporting surface; and means driving the friction clutch for elevating the supporting surface back to it starting position after the accumulation of a predetermined number of said pieces thereon thereby positioning the stack of laundry pieces for removal from the support member.

4,059,258

DOUBLE FOLD AUTOMATIC FOLDING APPARATUS

Frederick W. Grantham, 12055 Goshen Ave., Los Angeles, Calif. 90066

Filed July 7, 1975, Ser. No. 593,206
Int. Cl.[2] B65H *45/18*
U.S. Cl. 270—67 **20 Claims**

1. In combination with a machine for folding a sequence of articles and having an actuatable article folding knife, an article delivering conveyor belt driven by a first roller rotated in a first direction, an article receiving conveyor belt positioned in receiving relationship with respect to said delivering belt and driven by a second roller rotated in a second direction, said second roller being disposed generally above said first roller, and a receiving element disposed generally beneath and adjacent to said receiving belt, an apparatus for selectively making an additional fold in articles sequentially delivered by said delivering belt, which comprises:

a. an added roller,

said added roller being rotatable about a longitudinal axis thereof and being disposed parallel and adjacent to said first roller in a position to intercept leading edges of articles delivered by said delivering belt;

b. drive means connected to said added roller for causing said added roller to be rotated in either of said first and second directions;

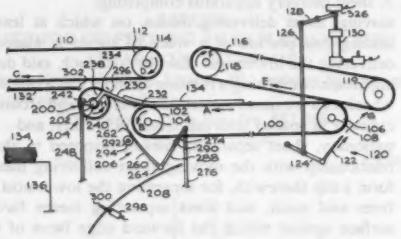
c. an added article folding knife means, said knife means including a blade having an article contacting edge;

d. restraining means for causing said blade to move along a predetermined path, portions of which extend between said first and said added rollers and toward said receiving belt;

e. actuating means connected to said added folding knife means for causing movement of said blade along said path; and

f. control means coooperating with said drive means and said actuating means for causing, in sequence,

1. said added roller to be rotating in said second direction when said leading edge of an article from said deliver-



ing belt contacts said periphery thereof, whereby to cause said leading edge to be deflected from its initial path of travel, away from said receiving belt and toward said added knife means,

2. said blade to be advanced across said path when a predetermined portion of said article has passed said added roller, whereby said edge of said blade is caused to contact a proximate portion of said article and advance said contacted portion toward said added roller to cause the additional folding of said article back upon itself,

3. said added roller to reverse and be again rotating in said first direction when said contacted portion of said article advanced by said blade contacts the periphery thereof, whereby the newly-folded portion of said article is carried around portions of said added roller towards said receiving belt, and

4. said added blade to be retracted in its path as said newly-folded portion is picked up by said receiving belt and said added roller.

4,059,259

SHEET CARTRIDGE FOR REPROGRAPHIC MACHINE

Nicola Cosmo, Ivrea (Turin), Italy, assignor to Ing. C. Olivetti & C., S.p.A., Italy

Continuation of Ser. No. 607,868, Aug. 26, 1975, Pat. No. 3,971,553. This application May 14, 1976, Ser. No. 686,340
Claims priority, application Italy, Sept. 2, 1974, 69662/74
Int. Cl.[2] B65H 5/22
U.S. Cl. 271—3 **3 Claims**

1. A cartridge for containing and serially feeding fresh sheets and for recovering used sheets respectively to and from a reporgraphic machine having a fresh sheet entry member and a used sheet exit, the cartridge comprising:

a container having means defining a first and a second chamber and means defining a corresponding opening for each chamber,

means connected to said container for removably positionifng the cartridge in the reprographic machine with said first opening adjacent to said fresh sheet entry and said second opening adjacent to said used sheet exit,

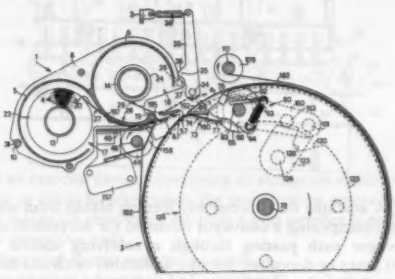
a feed reel in said first chamber,

a take-up reel in said second chamber,

a flexible support wound on said feed reel and having an end portion wound on said take-up reel,

a plurality of fresh sheets disposed in regularly spaced positions on said support, and interwound with said support on said feed reel,

first guiding means for guiding said support from said feed reel to said take-up reel along a predetermined path going out from said first chamber through said first opening and entering into said second chamber through said second opening,



means connected to said reels and operable when the cartridge is positioned in the reprographic machine for advancing said flexible support and a fresh sheet positioned thereon from said feed reel along said path,

means adjacent to said first opening for separating a fresh sheet advancing along said path from said flexible support to deflect it towards the fresh sheet entry, and

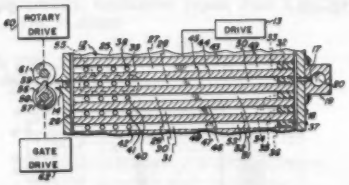
second guiding means in said second chamber for guiding, during the advancing of said flexible support, a used sheet entering into said second chamber through said second opening to wind the used sheet with said flexible support on said take-up reel.

4,059,260

DOCUMENT HANDLING APPARATUS

Klaus K. Stange, Pittsford; Richard E. Smith, Webster; Thomas J. Hamlin, Macedon, and James R. Cassano, Penfield, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Dec. 8, 1975, Ser. No. 638,590
Int. Cl.[2] B65H 5/22
U.S. Cl. 271—3 **8 Claims**



1. Document handling apparatus, comprising:

a. an exposure station having a gate;

b. a rack having a plurality of parallel pockets for storing documents;

c. means for moving the rack to sequentially align each of the pockets with the exposure station;

d. fluidic means for moving documents in aligned pockets into orthogonal registration with an aligned pocket and said gate;

e. means for moving a registered document into the exposure station; and

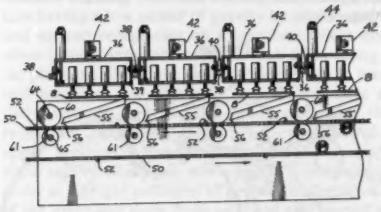
f. means for receiving documents from the exposure station.

4,059,261

MACHINE AND METHOD FOR SUCCESSIVELY FEEDING STACKED BLANKS

Robert L. Brown, 4055 Stoneview Circle, Stone Mountain, Ga. 30083

Filed June 10, 1976, Ser. No. 694,723
Int. Cl.² B65H *3/44, 5/16, 9/06*
U.S. Cl. 271—9 **1 Claim**



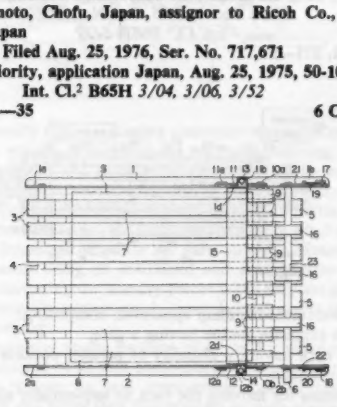
1. A machine for successively feeding blanks from stacks of blanks comprising a conveyor mounted for movement along a conveyor path passing through a receiving station where blanks may be deposited thereon; a plurality of chutes mounted successively above said conveyor path at the receiving station with each chute having an exit lip positioned in spaced relation adjacent said conveyor; means for extracting blanks from the stacks and for depositing them upon said chutes; means for holding blanks deposited upon said chutes comprising stops movably mounted adjacent said chute exit lips; means for substantially simultaneously releasing blanks held on said chutes thereby enabling the blanks to be simultaneously placed upon the conveyor and successively conveyed from the receiving station which includes means for reciprocally cycling said stops between a position for holding blanks on said chutes and a position for releasing blanks from said chutes in timed sequence with movement of said conveyor through the receiving station and means for pushing blanks down said chutes in time relation with cyclic movements of said stops with said pushing means comprising an endless chain having a push lug mounted thereto coupled with and driven by said stops reciprocal cycling means.

4,059,262

SHEET DELIVERY APPARATUS

Sakae Fujimoto, Chofu, Japan, assignor to Ricoh Co., Ltd., Tokyo, Japan

Filed Aug. 25, 1976, Ser. No. 717,671
Claims priority, application Japan, Aug. 25, 1975, 50-102684
Int. Cl.² B65H *3/04, 3/06, 3/52*
U.S. Cl. 271—35 **6 Claims**



1. A sheet delivery apparatus comprising:

a moving, sheet delivering means, on which at least the leading end portion of a stack of sheets is placed, for delivering the lowermost sheet in said stack; said delivering means comprising a plurality of spaced, parallel-running endless belts; and

a stationary, sheet separating means, disposed in abutting relationship with the moving sheet delivering means to form a nip therewith, for separating the lowermost sheet from said stack; said sheet separating means having a surface against which the forward edge faces of sheets disposed in said stack bear, said surface being inclined with respect to the sheet delivering means in a manner such that a lower sheet has its forward end advanced relative to the forward end of an upper sheet, and the separating means comprising a plurality of spaced surfaces, respectively spanning the spaces between the endless belts and bearing against the respective sheet-engaging surfaces of adjacent endless belts only at the edge portions thereof, and having a coefficient of friction with respect to the sheets in the region at the nip which is less than the coefficient of friction of the delivering means with respect to the sheets.

4. A sheet delivery apparatus comprising:

a moving, sheet delivering means, on which at least the leading end portion of a stack of sheets is placed, for delivering the lowermost sheet in said stack, said delivering means comprising a rotating cylinder and a plurality of wheels of a frictional material disposed on and around said cylinder at spaced intervals from each other; and

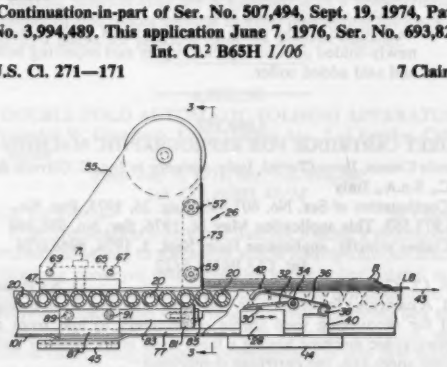
a stationary, sheet separating means, disposed in abutting relationship with the moving sheet delivering means to form a nip therewith, for separating the lowermost sheet from said stack, said sheet separating means having a surface against which the forward edge faces of sheets disposed in said stack bear, said surface being inclined with respect to the sheet delivery means in a manner such that a lower sheet has its forward end advanced relative to the forward end of an upper sheet, and the separating means comprising a plurality of spaced surfaces which respectively span the spaces between the wheels and bear against the respective sheet-engaging surfaces of adjacent wheels only at the edge portions thereof, and having a coefficient of friction with respect to the sheets in the region at the nip which is less than the coefficient of friction of the delivering means with respect to the sheets.

4,059,263

VACUUM FEED

Edward V. Henc, Promisedale Farms R.D. No. 2, Malvern, Pa. 19355

Continuation-in-part of Ser. No. 507,494, Sept. 19, 1974, Pat. No. 3,994,489. This application June 7, 1976, Ser. No. 693,825
Int. Cl.² B65H *1/06*
U.S. Cl. 271—171 **7 Claims**



1. Apparatus for feeding blanks of sheet material to processing machinery comprising:

a feed bed for supporting a stack of blanks;

means to drive the lowermost blank of said stack to said processing machinery;

vacuum means to control alignment of the lowermost blank, said vacuum means being positioned beneath said feed bed and including a vacuum chamber of fixed size; and

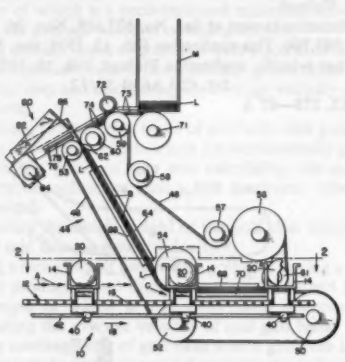
an adjustable backstop member to be adjusted according to the size of blanks being processed including means adjustable along with said backstop member to create a seal between said feed bed and adjacent structure of said chamber, said adjustable sealing means serving to partition said chamber at different intervals as determined by the size of blanks being processed.

4,059,264

METHOD OF FEEDING A LEAFLET AND THE APPARATUS THEREFOR

Walter H. Vogel, Hoffman Estates, Ill., assignor to Redington, Incorporated, Bellwood, Ill.

Filed May 3, 1976, Ser. No. 682,248
Int. Cl.² B65H *39/06*
U.S. Cl. 271—270 **6 Claims**



5. The method of transferring leaflets to leaflet clamps having at least two clamping surfaces, said clamps having an open position for insertion of leaflets between said clamping surfaces and a closed position for clamping a leaflet which has been inserted between said clamping surfaces, said method comprising the following steps:

a. conveying said leaflet clamps in spaced relationship along a first path;

b. conveying spaced leaflets along a second path which converges with said first path, said second path having a first portion which intersects said first path and a second portion which is substantially coincident with said first path, so that said leaflets arrive at the point of convergence of said first and second paths in an interlaced relationship with said leaflet clamps;

c. opening each of said clamps before said point of convergence;

d. advancing said leaflets at a greater linear speed than said leaflet clamps so that each leaflet becomes aligned between the clamping surfaces of its respective leaflet clamp; and

e. closing each of said clamps after its respective leaflet has become aligned between the clamping surfaces thereof.

4,059,265

ELASTIC PULL-TYPE EXERCISER

Horst K. Wieder, 1207 Riverview Lane, Watertown, Wis. 53094, and Klaus A. Wieder, Rte. No. 1, Helenville, Wis. 53137

Filed Jan. 22, 1976, Ser. No. 651,271
Int. Cl.² A63B *21/04*
U.S. Cl. 272—137 **4 Claims**

1. In an exercise device comprising an elongated elastomeric member or cable for exercising, the combination comprising:

a bar means for removably securing a grip member in each of its respective ends,

an elongated elastic member or cable,

a grip member adapted to be inserted in the ends of said bar means,

said grip member being elongated to provide a first end and a second end,

said grip member having two cylindrical passages each communicating from said first end to said second end and each having an axis,

each of said passages having a diameter only slightly greater than the diameter of said cable to thereby slidingly receive said cable in said passage,

said passages being contiguous and separated only by a web portion of said grip member,

said axes of said passages being parallel,

said grip member having an outer surface with portions of said outer surface conforming in shape to portions of said passages contained in said grip member,

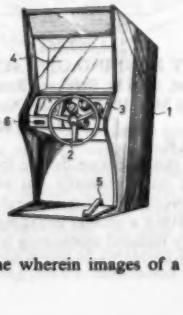
said grip member having an enlarged portion at one end for limiting the extent of travel of each grip member within the bar means.

4,059,266

GAME MACHINE

Masaya Nakamura, Tokyo, Japan, assignor to Kabushiki Kaisha Nakamura Seisakusho, Tokyo, Japan

Filed Nov. 18, 1976, Ser. No. 743,065
Claims priority, application Japan, June 3, 1976, 51-64059; June 7, 1976, 51-65610
Int. Cl.² A63F *9/14*
U.S. Cl. 273—1 E **10 Claims**



3. A game machine wherein images of a road and motor

vehicles running thereover can be formed on a screen, comprising:

a rotary body including a rotary member and motor vehicle model support members incapable of rotation relative to said rotary member and movable radially of the center of rotation thereof;

a background scenery disk arranged coaxially with said rotary body and spaced axially therefrom for rotation independently thereof;

a transparent road image forming means represented on said background scenery disk and surrounding the center of rotation of said disk in a cloud loop;

means for moving the motor vehicle models relative to one another widthwise of the road image forming means within the widthwise spacing thereof;

a screen;

a light source for projecting on said screen the images of road represented on said disk and of the motor vehicle models; and

drive means for rotating said disk and said rotary body.

4,059,267

FOLLOW THROUGH INDICATOR FOR BOWLERS

Howard E. Noble, 30 Stoneleigh, Apt. 1, Buffalo, N.Y. 14223

Filed June 28, 1976, Ser. No. 700,306
Int. Cl.² A63B *71/06*
U.S. Cl. 273—54 B **6 Claims**

1. A follow through indicator for bowlers comprising:

a. a generally planar base element;

b. means for fastening said base element to the arm of a bowler in a manner such that said base element is in a plane generally parallel to the path through which the bowler's arm will move during delivery and throw of the ball;

c. an indicator element movably mounted on said base for movement in a direction against the force of gravity from an initial or rest position to a position indicating that a proper follow through has been made;

d. said base element having means for guiding said indicator element for movement along a path generally parallel to the path through which the bowler's arm will move during delivery and throw of the ball; and

e. holding means for holding said indicator element in said position indicating proper follow through is reached for maintaining the indication for visual inspection by the bowler.

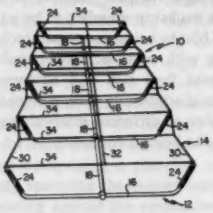
4,059,268

AGILITY RUNNING OBSTACLE DEVICE

Charles P. Forrest, 1306 St. Stephens Road, Mobile, Ala. 36603

Filed May 10, 1977, Ser. No. 795,500
Int. Cl.² A63B *67/00*
U.S. Cl. 273—55 R **7 Claims**

1. A portable running rope device for use by a runner to practice running on a generally flat surface comprising an elongated framework including a plurality of U-shaped cross members each having a ground engaging center portion and a pair of outwardly inclined upstanding legs, a coil spring connected to and projecting upwardly from each of said upstanding legs and capable of flexing in the direction of an applied force, a plurality of longitudinally extending center bars connecting the U-shaped cross members together in a spaced relationship and a latticework of running ropes attached to the upper ends of said coil springs.

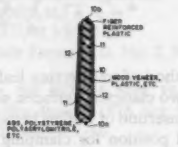


4,059,269

HOCKEY STICK OR THE LIKE, PARTICULARLY BLADE STRUCTURE THEREOF

Antti-Jussi Tiitola, Tampere, Finland, assignor to Karhu-Titan Oy, Finland

Continuation-in-part of Ser. No. 527,448, Nov. 26, 1974, Pat. No. 3,982,760. This application Feb. 13, 1976, Ser. No. 658,098
Claims priority, application Finland, Feb. 18, 1975, 750454
Int. Cl.² A63B *59/12*
U.S. Cl. 273—67 A **12 Claims**



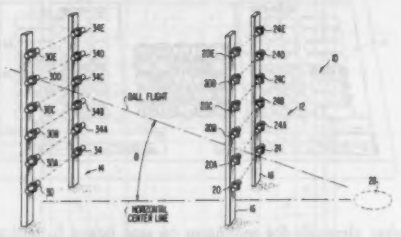
1. In a stick to be used in ice hockey or the like, a lower blade structure having a core consisting in its entirety of a single body of wear-resistant material extending all the way from a front tip of the blade structure to a rear end thereof as well as all the way from a lower edge of the blade structure to a top edge thereof, said body having opposed side surfaces, a pair of opposed strengthening layer respectively joined to and almost but not entirely covering said opposed side surfaces of said core body, the latter having an elongated bottom edge region extending along the entire length of the blade structure and extending downwardly beyond said strengthening layers and said core body also having an upper elongated edge region extending along the entire length of the blade structure upwardly beyond said strengthening layers, whereby said wear-resistant core body is exposed at its elongated bottom and upper edge regions for providing the blade structure with wear and impact resistant regions at least along the lower and upper edges of the blade structure.

4,059,270

METHOD FOR CUSTOM FITTING GOLF CLUBS

Bernard Sayers, Box 423, Newport, N.J. 08345

Filed Nov. 18, 1975, Ser. No. 632,950
Int. Cl.[2] A63B 69/36
U.S. Cl. 273—77 R 5 Claims



1. A method of custom designing a golf club for a particular individual golfer which will give the maximum distance of ball travel, said method comprising the steps of:

a. providing means for adjusting the club head weight, lie angle, and golf club shaft length used by the particular individual golfer during the practicing of this method;

b. providing means for measuring the velocity and loft angle of golf balls hit by the particular individual golfer during the practicing of this method;

c. hitting a series of golf balls with a golf club the club head weight of which is a predetermined minimum and calculating the average velocity of said golf balls;

d. hitting another series of golf balls with a golf club the club head weight of which is incrementally greater than in the previous step and calculating the average velocity of said golf balls;

e. continuing to hit further series of golf balls with golf clubs having club head weights which are incrementally greater than in the previous step and calculating the average velocity of each series until a first maximum velocity is established;

f. calculating the swing weight of the golf club which produced said first maximum velocity;

g. hitting a series of golf balls with a golf club having a swing weight producing said first maximum velocity and a shaft the length of which is a predetermined minimum and calculating the average velocity of said golf balls;

h. hitting another series of golf balls with a golf club having a swing weight producing said first maximum velocity and a shaft length of which is incrementally longer than in the previous step and calculating the average velocity of said golf balls;

i. continuing to hit further series of golf balls using golf clubs having a swing weight producing said first maximum velocity and shafts the lengths of which are incrementally larger than in the previous step and calculating the average velocity of each series until a second maximum velocity is established;

j. hitting a series of golf balls with a golf club having a swing weight producing said first maximum velocity and a shaft length producing said second maximum velocity and a predetermined lie angle and calculating the average velocity of said golf balls;

k. continuing to hit further series of golf balls using golf clubs having a swing weight producing said first maximum velocity and a shaft length producing said second maximum velocity and a lie angle which is incrementally different than in the previous step and calculating the average velocity of each series until a third maximum velocity is established; and

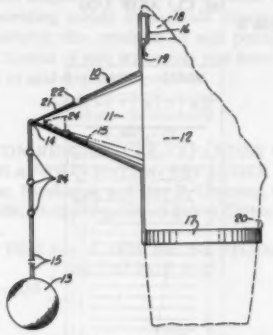
l. calculating the average lift-off angle of a series of balls hit with a golf club having a swing weight producing said first maximum velocity, a shaft length producing said second maximum velocity, and a lie angle producing said third maximum velocity and determining from said average lift-off angle the optimum loft angle for the particular individual golfer.

4,059,271

HIP MOUNTED TETHERED BALL GAME

Herman K. Dupre, Seven Springs, Champion, Pa. 15622

Filed July 23, 1976, Ser. No. 708,089
Int. Cl.[2] A63B 67/10, 67/16
U.S. Cl. 273—95 A 5 Claims



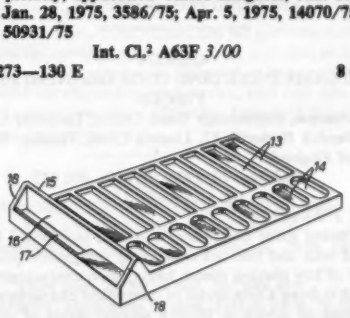
1. A hip mounted tethered ball game comprising a bracket having means to attach the same to a person at the hip region, said bracket having an extended portion to extend outwardly from a person's hip region, and a ball tethered to the extended end of said bracket by a tether, said bracket consisting of a horizontally positioned cone having a slot therethrough extending upwardly from the cone tip, at least one stop on said tether being larger in cross section than said tether, said slot being sized to pass said tether therethrough but too narrow to pass said stop, and an opening at the upward end of said slot sufficiently large to pass said stop therethrough.

4,059,272

GAMES AND EDUCATIONAL DEVICES

Burke Cole Pullman, 14 St. Leonard's Terrace, London, S.W.3., England

Filed Jan. 12, 1976, Ser. No. 648,156
Claims priority, application United Kingdom, Jan. 10, 1975, 1054/75; Jan. 28, 1975, 3586/75; Apr. 5, 1975, 14070/75; Dec. 11, 1975, 50931/75
Int. Cl.[2] A63F 3/00
U.S. Cl. 273—130 E 8 Claims



1. Amusement or educational apparatus comprising a plurality of playing pieces carrying various different markings, a plurality of scoring pieces, different from said playing pieces, and a base having a plurality of transverse rows of locating formations or markings to locate and display a group of selected individual playing pieces, the said base also having additional locating formations or markings to locate and display at least one scoring piece in association with each row of

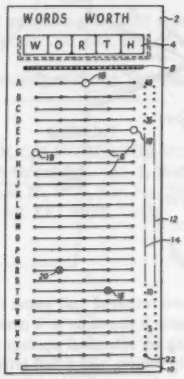
playing pieces, and including means for mounting a further row of selected playing pieces, and means for concealing said further row of playing pieces from a player observing the first mentioned group of playing pieces.

4,059,273

WORD GAME HAVING A BOARD AND A PLURALITY OF PIECES

Michael Kindred, Bilborough, England, assignor to Invicta Plastics Limited, England

Filed Dec. 20, 1976, Ser. No. 752,512
Int. Cl.² A63F 3/00
U.S. Cl. 273—130 R **5 Claims**



1. A board game comprising a board having a reserved area adapted to display a target word selected by a first player, a shield capable of hiding the target word from the view of a second player, said board being further provided with a playing area composed of a plurality of rows and columns of playing positions, the number of the rows corresponding to the number of letters in the alphabet being used and each row being identified by a letter of that alphabet, the end portion of the playing area bearing the first part of said alphabet having an identifying characteristic and the end portion of the playing area bearing the last part of the alphabet having a contrasting characteristic, a plurality of test playing pieces each identical with one another, a plurality of first marker pieces having said first identifying characteristic and a plurality of second marker pieces having said second characteristic.

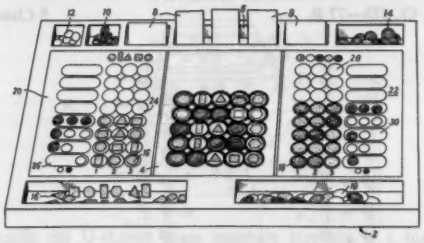
4,059,274

BOARD GAME INCLUDING CODE DEFINING PLAYING PIECES

Ronald Samson, Harborough Road, Oadby, Leicester LE2 4LB, and Derrick Botterill, 17, Lincoln Close, Tupsley, Hereford, both of England

Filed Jan. 19, 1976, Ser. No. 650,417
Int. Cl.² A63F 3/00
U.S. Cl. 273—130 D **6 Claims**

1. A board game comprising a board, said board having a reserved area and two areas defining designated positions, a pluraity of key playing pieces having two characteristics, one of which is from a first series of contrasted characteristics and the second of which is from a second series of contrasted characteristics, said playing pieces being adapted to be mounted on said reserved area of the board in a pattern chosen at will by a player to serve as a target code, means for shielding the chosen code of playing pieces when so mounted, a plurality of first test playing pieces conforming with the key playing pieces in respect of the first of said series of characteristics, a plurality of second test playing pieces conforming with the key playing pieces in respect of the second of said series of characteristics, each plurality of test playing pieces being mountable in one of said two designated positions on the board in successive groups with the object of simulating the respective characteristics of the key playing pieces in the code pattern, and



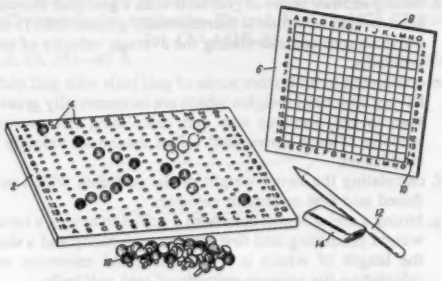
marker elements for mounting on said board to indicate the correctness of the characteristics and relative position of the test playing pieces in each successive group.

4,059,275

BOARD GAME

William Laurence Price, Harborough Road, Oadby, Leicester LE2 4LB, England

Filed Jan. 19, 1976, Ser. No. 650,301
Int. Cl.² A63F 3/00
U.S. Cl. 273—130 D **1 Claim**



1. A game set comprising a board having means thereon identifying grid positions, a plan having means thereon for identifying like grid positions, said plan having two lines dividing said plan into at least four identifiable regions with said lines intersecting in at least one target point and said four regions all converging on said target point, and test pieces for placement on said board for identifying on said board selected test positions among said grid positions, said test pieces including at least five identifiable groups of pieces, the pieces of four of said groups corresponding to said four regions and the pieces of a fifth of said group corresponding to said lines whereby a player using said test pieces and said board may determine said target point.

4,059,276

BOARD GAME

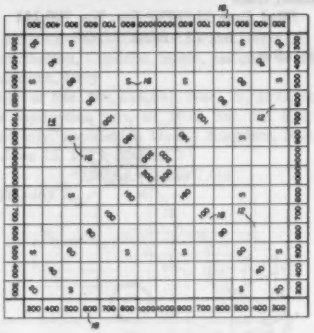
Robert W. Weniger, 401 Maryland Ave., Havertown, Pa. 19083

Filed Feb. 11, 1976, Ser. No. 657,090
Int. Cl.² A63F 3/00
U.S. Cl. 273—134 D **6 Claims**

1. a game comprising:
a square flat board including thereon four playing sides,
a central area within said four playing sides containing a multitude of squares, each corner of said board being blank, squares along the sides of said central area being

marked with different values, squares within the central area being marked with different values,

said marked squares each having numerals designating the value of said square, four sets of manually movable play-



ing pieces used in the central area, each set containing as many pieces as there are squares in each board line between the blank corner squares, means to determine the number of spaces a player's piece may be moved.

4,059,277

STYLUS ARM LIFTING/LOWERING APPARATUS FOR A VIDEO DISC PLAYER SYSTEM

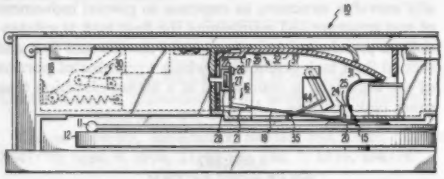
Ralph DeStephanis, Middlesex, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Mar. 16, 1976, Ser. No. 667,387

Claims priority, application United Kingdom, Sept. 15, 1975, 37849/75

Int. Cl.² G11B *9/06, 3/02*

U.S. Cl. 274—23 A **5 Claims**



1. In a system for playing back prerecorded signals from a spirally grooved record disposed on a turntable rotatably mounted with respect to a base of said playback system; said system including a support member and a stylus arm; said stylus arm carrying a groove-riding stylus at one end thereof and being pivotally secured at the end thereof, remote from said one end, to said support member; an apparatus comprising:

1. a movable element secured to said support member for movement between a first location and a second location; said movable element including a permanent magnet;

2. a stylus arm rest secured to said movable element subject to engagement with said stylus arm in a region thereof remote from said pivoted end of said stylus arm;

the configuration of said stylus arm rest being such that said stylus arm rest occupies (a) an elevated position when said movable element is in said first location, and (b) a depressed position when said movable element is in said second location;

said stylus arm rest in said elevated position supporting said stylus arm in a manner precluding stylus/record contact;

said stylus arm rest in said depressed position permitting said stylus arm to establish said stylus/record contact when said stylus overlies said record for playback;

3. a stationary element secured to said support member; said stationary element including means for generating magnetic flux;

the location of said stationary element being such that said permanent magnet is located in proximity to said magnetic flux generating means when said stylus arm rest is in said elevated position; and

4. selectively operated means for providing a given polarity of energization of said magnetic flux generating means; and

wherein the orientation of said permanent magnet relative to said magnetic flux generating means is such that said permanent magnet is repelled away from said magnetic flux generating means during said energization of said given polarity; the repulsion of said permanent magnet causing motion of said stylus arm rest from said elevated position to said depressed position.

4,059,278

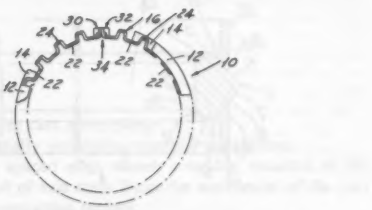
PISTON RING SPACER-EXPANDER WITH OVERLAP-PREVENTING EXPANDER JOINT

Lee H. Saylor, Muskegon, and Roy E. Overway, Grand Haven, both of Mich., assignors to Sealed Power Corporation, Muskegon, Mich.

Filed Aug. 5, 1976, Ser. No. 711,850

Int. Cl.² F02F *5/00*

U.S. Cl. 277—139 **10 Claims**



1. In a parted circular spacer-expander for use in a piston oil control ring and including a plurality of alternating concentric circumferentially spaced radially outer and inner crowns integrally interconnected by generally diverging legs, the improvement wherein each end crown at the parting of the ring has an end tab extending therefrom comprising a plurality of successive contiguous portions formed at substantially right angles with respect to each other, the first said tab portion being contiguous with an edge of said end crown and extending radially therefrom, other of said end tab portions extending back toward the corresponding end crown such that an edge of another of said tab portions is disposed at substantially the radius of said corresponding end crown, said end tabs being substantially self-supporting under stress from both the circumferential and radial directions.

4,059,279

HOLLOW PERCUSSION DRILL ROD WITH SEAL FOR CLEANING FLUID INLET TUBE

Roger Montabert, 19, Avenue des Colonnes, Bron (Rhone), France

Filed June 22, 1976, Ser. No. 698,495

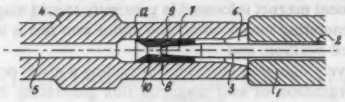
Claims priority, application France, July 4, 1975, 75.21786

Int. Cl.² F16K *41/14;* B25D *17/02, 17/22*

U.S. Cl. 277—166 **7 Claims**

1. A percussion drill comprising a sealing device in a fluid injection circuit between a fluid inlet tube and a drill rod, the sealing device comprising a sealing socket which is engageable at one end on an end of the fluid inlet tube and has a bore complementary in shape to said one end of the fluid inlet tube, the sealing socket having an outer metal casing locatable in a bore in the drill rod, and a resilient member which is secured in

the casing and defines, at the other end of the socket, a flared part forming an annular lip which, when in a normal condition,



has a diameter larger than the diameter of the bore of the drill rod.

4,059,280

SEAL RING ASSEMBLY

Brian Geoffrey Eastwood, Woking, England, assignor to Hall & Hall Limited, Hampton, England

Filed July 2, 1975, Ser. No. 592,541
Int. Cl.[2] F16J *15/24*
U.S. Cl. 277—188 A **10 Claims**

1. A seal ring assembly comprising

a. a sealing ring which is an annulus about a central axis, the sealing ring

i. having a radially inner and a radially outer periphery

ii. having a working surface at one of the radially inner and radially outer peripheries

b. a supporting ring which is an annulus about a central axis and of generally the same radius as the sealing ring, the supporting ring

i. being harder than the sealing ring and

ii. having a radially inner and a radially outer periphery and

iii. having a lip extending axially in one axial direction at the radially inner periphery and

iv. having a lip extending axially in the one axial direction at the radially outer periphery, the lip at the one of the radially inner and outer peripheries which corresponds to that periphery of the sealing ring which has the said working surface extending axially further than the other said lip, and

v. being separate from the sealing ring; and

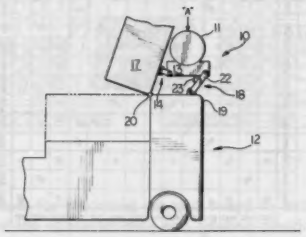
c. a bearing ring separate from the supporting ring and being harder than the sealing ring and having one radial periphery of substantially the same radius as the periphery of the sealing ring which provides the working surface whereby the rings may be placed axially side by side in a seal ring assembly with the sealing ring adjacent to the supporting ring and the supporting ring adjacent the bearing ring, the sealing ring being overlapped and supported at its radially inner and outer peripheries by the lips of the supporting ring, the working surface being supported by the lip of greater axial extension.

4,059,281

MOUNTING ASSEMBLY FOR A CONTROLLABLY MOVABLE FLUID TANK

Dafydd W. Evans, Euclid, Ohio, assignor to Towmotor Corporation, Mentor, Ohio

Filed June 28, 1976, Ser. No. 700,241
Int. Cl.[2] B60K *15/08*
U.S. Cl. 280—5 A **10 Claims**



1. In a fluid tank mounting apparatus for connecting the fluid tank to a vehicle, the improvement comprising:

a vehicle frame;

a structure pivotally movable relative to the frame from a closed position in a direction towards said fluid tank to an open position;

first means for pivotally connecting a first preselected portion of the fluid tank to the pivotally movable structure of the vehicle; and

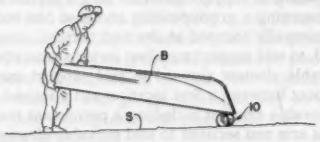
second means for pivotally connecting a second preselected portion of the fluid tank to the frame of the vehicle for moving the fluid tank between a first position at which said fluid tank is at a first position generally superjacent said pivotally movable structure and a second position at which said fluid tank is displaced from the first position rearwardly, in a direction generally away from the pivotally movable structure, in response to pivotal movement of said structure and maintaining the fluid tank at substantially a preselected attitude at and between said first and second fluid tank positions at which a preselected portion of the fluid tank is maintained at a higher elevation than other tank portions.

4,059,282

BOAT BOW DOLLY

Ervin Prickett, 11331 Kumquat St., Coon Rapids, Minn. 55433

Filed Sept. 8, 1976, Ser. No. 721,394
Int. Cl.[2] B60P *3/10*
U.S. Cl. 280—47.13 B **4 Claims**



1. A dolly for transporting a boat over a surface comprising:

a substantially planar mounting plate adapted to be secured to the bow of a boat, and

a wheel bracket including a wheel rotatably mounted thereon removably secured to said mounting plate, said mounting plate including

depending flange means forming a slot for receiving said wheel bracket, and

means for removably locking said wheel bracket on said plate in said slot, said removable locking means including a substantially U-shaped resilient clip on said mounting

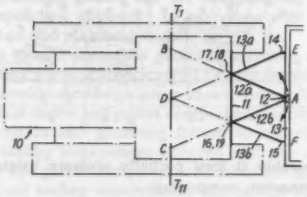
plate in front and back of said slot, said clips including a free leg and a bight portion facing each other and said slot.

4,059,283

THREE-POINT TRACTOR LINKAGE

Peter Alfred Shelton, Capdella, Spain, assignor to Fiat Trattori S.p.A., Modena, Italy

Continuation of Ser. No. 418,041, Nov. 29, 1973, abandoned.
This application Nov. 10, 1975, Ser. No. 630,783
Claims priority, application United Kingdom, Nov. 22, 1972, 53937/72; June 25, 1973, 30095/73
Int. Cl.[2] B60D 1/16
U.S. Cl. 280—461 A 17 Claims



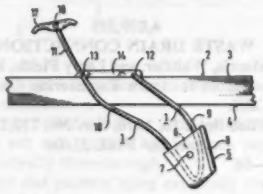
1. A three-point linkage for use in coupling farm implements to a tractor, comprising two lower links from the tractor to the lower points of the linkage, upper link means from the tractor to the upper point of the linkage in the form of two upper links each containing a hydraulic ram, the two upper links diverging from pivots at the upper point to pivots on the tractor, and control means including a valve mechanism interconnecting the cavities of the rams such that the lengths of the two upper links can be caused or permitted to vary by control of the rams such that (a) the upper links can float in unison in the fore and aft direction and (b) the upper point of the linkage can move laterally spontaneously.

4,059,284

SKI BRAKE MECHANISM

Günter Schwarz, Steinacherstr. 67, 8804 Au, Switzerland

Filed Mar. 17, 1976, Ser. No. 667,689
Claims priority, application Switzerland, Mar. 21, 1975, 3847/75; Sept. 9, 1975, 11759/75; Jan. 7, 1976, 188/76
Int. Cl.[2] A63C 7/10
U.S. Cl. 280—605 15 Claims



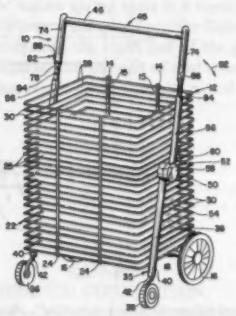
1. A ski brake mechanism for use with a ski having a running surface, comprising a brake arm and an actuation portion which can be depressed by the ski boot, the brake arm and actuation portion being formed integrally from a common spring wire, the brake arm comprising essentially a substantially loop-shaped section of the spring wire providing two legs, means defining two transversely extending mutually spaced pivot shafts and means mounting said means defining the pivot shafts upon the ski, said two legs being connected with said means defining the pivot shafts, said actuation portion essentially comprising a lever-like wire section operatively connected with one of said legs.

4,059,285

HOME SHOPPING CART

Willie McCoy, P.O. Box 108, Wakefield Station, Bronx, N.Y. 10466

Filed Sept. 8, 1976, Ser. No. 721,335
Int. Cl.[2] B62B 11/00
U.S. Cl. 280—651 8 Claims



1. A shopping cart, comprising:

a. a substantially vertically extending main frame,

b. laterally spaced main wheels rotatably mounted at the lower end of said main frame for movement of the cart along a supporting surface,

c. auxiliary frame means articulately connected to said main frame for movement relative thereto between a closed position substantially coplanar with said main frame to an open position where said auxiliary frame projects forwardly from said main frame,

d. an auxiliary wheel frame having a pair of auxiliary wheels at one end thereof and articulately connected to said auxiliary frame means and being adapted, in said extended position of the latter, to engage the supporting surface along which the cart is movable at locations spaced forwardly from said main wheels,

e. handle means adapted to be gripped by the user,

f. mounting means for removably coupling said handle means to said auxiliary wheel frame so as to obtain angular adjustment thereof for the convenience of the user of the cart, such that the relative angular relationship of said handle means to said auxiliary wheel frame may vary,

g. extension means operatively associated with said handle means to vary the length thereof between said mounting means and the free end thereof, and

h. said handle means includes:

i. a pair of legs removably secured to said mounting means at substantially one end thereof,

ii. a handle bar extending transversely across said auxiliary frame and adapted to be gripped by the user of the cart,

iii. a pair of arms having a bore therein and connected to said handle bar in spaced relationship with each other, said legs adapted to extend in telescopic relationship to said arms and within said bores,

iv. a spring in each said bore to apply a force between said arms and said legs, and

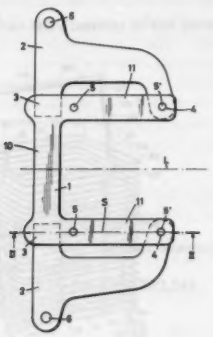
v. coupling means adapted to retain said handle bar in different extended positions relative to said legs.

4,059,286

WHEEL SUSPENSION FOR MOTOR VEHICLES

Heinz Otto, Wolfsburg, and Bernhard Ilsemann, Weddel, both of Germany, assignors to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

Filed July 14, 1976, Ser. No. 705,003
Claims priority, application Germany, Aug. 18, 1975, 2536060
Int. Cl.² B60G 3/20
U.S. Cl. 280—673 8 Claims



1. In a wheel suspension for a motor vehicle in which transverse, longitudinal or oblique control arms in communication with the wheel supports of the vehicle wheels are articulated to a subframe by linkage bearings which include bearing bolts, and said subframe is releasably fastened to the vehicle chassis; the improvement wherein:

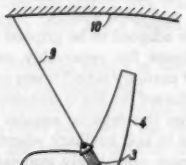
the bearing bolt of at least one said linkage bearing of each said control arm articulated to said subframe simultaneously serves to fasten said subframe to the vehicle chassis.

4,059,287

SAFETY BELT FOR MOTOR VEHICLES

Per Olaf Weman, Hashman, Germany, assignor to Sigmatex, A.G., Basel, Switzerland

Division of Ser. No. 550,098, Feb. 14, 1975, Pat. No. 3,977,701, which is a division of Ser. No. 316,953, Dec. 20, 1972, Pat. No. 3,887,212. This application May 13, 1976, Ser. No. 685,954
Int. Cl.² B60N 21/02
U.S. Cl. 280—745 3 Claims



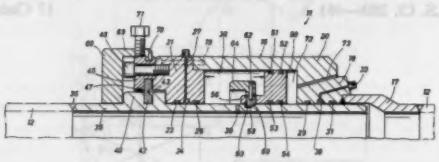
1. A safety belt apparatus for a motor vehicle comprising: a hip belt adapted to be fastened across the hips of an occupant in the vehicle, said hip belt having two ends, said hip belt secured permanently at the two ends adjacent to the vehicle floor, at least one belt roller attached to an end of said hip belt, and at least one traction means which unrolls the hip belt from the belt roller when the car door is opened and releases the belt so that it can be rolled up by the belt roller to bear tightly on the body of the occupant when he is seated in a seat of the vehicle; and wherein said traction means comprises at least one rope, one end of which is connected to an intermediate portion of said hip belt, means for mounting the other end of said hip belt to the roof of said vehicle, further means for displacing said other end of said hip belt in a fore and aft longitudinal direction of said vehicle.

4,059,288

PRESSURE BALANCED SAFETY PIPELINE CONNECTOR

Harvey O. Mohr, Houston, Tex., assignor to HydroTech International, Inc., Houston, Tex.

Filed Sept. 1, 1976, Ser. No. 719,437
Int. Cl.² F16L 35/00, 37/00
U.S. Cl. 285—2 4 Claims



1. A separable at least partially pressure balanced safety pipeline connector, comprising:

a housing having one axial end adapted for connection to said pipeline, and having the other axial end open;

a pipe extension member having one axial end adapted for connection to said pipeline for transmission of line fluid therethrough and with the other axial end arranged for being telescopically received coaxially in said housing in sealable relationship therewith;

shear means for restraining said housing and extension member against axial separation in response to axial tension forces applied thereto below a predetermined level and shearable above said to permit axial separation of said housing and extension member;

an annular piston supported between said housing and said extension member forming an annular pressure chamber about said extension member;

means for releasably attaching said piston to one of said housing and said extension member and being releasable after shearing of said shear means;

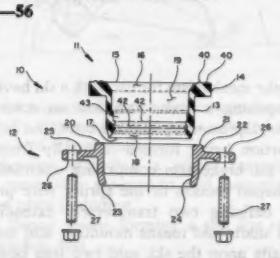
and conduit means for communicating line pressure to said annular chamber, whereby the effect of line pressure in said pipeline normally urging axial separation of said housing and said extension member is at least partially balanced by the pressure within said annular chamber.

4,059,289

WASTE DRAIN CONNECTION

Earl Lavern Morris, Whittier, and Larry Fields, La Puente, both of Calif., assignors to Acorn Engineering Company, City of Industry, Calif.

Filed Sept. 10, 1976, Ser. No. 722,104
Int. Cl.² F16L 21/04
U.S. Cl. 285—56 13 Claims



1. Apparatus for coupling the waste outlet of a plumbing fixture to a plumbing drain pipe in fluid communication and for effecting a fluid sealing relationship therewith, wherein the

waste outlet of said plumbing fixture has an annular gasket-receiving receptacle thereabout, comprising:

a. a fluid sealing member of elastic material having a tubular portion adapted to form a sleeve for intimate engagement about the exterior of said drain pipe and further having an outwardly-extending flange adapted to form a gasket for fluid sealing disposition within said gasket receptacle; and

b. a sleeve and gasket compression member of non-elastic material having a through bore wherein said tubular portion of said fluid sealing member is mounted and one end of sleeve and gasket compression member is disposed in abutting relationship to said gasket of said fluid sealing member; and

c. means on said sleeve and gasket compression member for mounting said sleeve and gasket compression member to said plumbing fixture and for cooperatively effecting a corresponding alignment of said bore with said waste outlet of said plumbing fixture;

d. means on said sleeve and gasket compression member for adjusting the axial displacement of said sleeve and gasket compression member relative to said fluid sealing member after said sleeve and gasket compression member has been mounted to said plumbing fixture to adjustingly effect fluid sealing engagement between said one end of said sleeve and gasket compression member and said flange of said fluid sealing member and said gasket receptacle of said plumbing fixture; and

e. means about said through bore and the other end of said sleeve and gasket compression member for deforming said sleeve into gripping and sealing engagement with said plumbing drain pipe in response to axial displacement of said sleeve and gasket compression member with said fluid sealing member.

4,059,290

JOINT FOR CONNECTION OF GAS COCK TO METAL PIPE

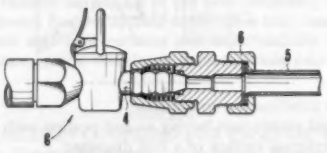
Hideo Ichimi, No. 33, Aza-Idogo, Ohaza-Tomiyoshishinden, Kiracho Haza, Aichi, Japan

Filed Nov. 19, 1975, Ser. No. 633,337

Claims priority, application Japan, Dec. 4, 1974, 49-147230[U]

Int. Cl.² F16L *19/00, 55/00*

U.S. Cl. 285—169 **1 Claim**



1. A joint assembly for connecting a metal pipe to a gas cock comprising in combination

1. a connection cylinder having a mid portion, a right end portion, a left end portion and an open passageway extending centrally therethrough,

a. said right end portion being externally threaded, and

b. said left end portion

having an externally threaded surface, and

having an annular stepped portion located between said open passageway and said externally threaded surface,

2. a cap nut

having an open passageway therethrough,

having a right end portion that is internally threaded and which engages the externally threaded left hand portion of said connection cylinder, and

having an inwardly tapered surface towards the left end of said cap nut

3. a gas cock hose fitting extending through the left end of said cap nut and inwardly thereof to a point adjacent to the left end of said connection cylinder, said gas cock hose fitting having a plurality of annular preformed constrictions and an externally tapered end portion,

4. a volute spring positioned between the exterior of said gas cock hose fitting and the interior of said cap nut, and

5. an O-ring disposed between the exterior inner end of said gas cock hose fitting and the said annular stepped portion of said connection cylinder, said O-ring engaging said externally tapered end portion of said gas cock hose fitting, whereby, when the externally threaded left hand portion of said connection cylinder and the internally threaded portion of said cap nut are screwed together the left end of the volute spring seats in a constricted portion of said hose fitting to thereby keep the fitting from being pulled to the left and the right end of the gas cock hose fitting abuts against the left end of said connection cylinder in a sealing relationship with the aid of said O-ring.

4,059,291

BRANCH CONNECTION

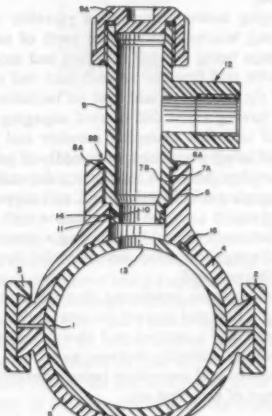
Petrus Marinus Acda, Enkhuizen, and Hans Edward Guitoneau, Bovenkarspel, both of Netherlands, assignors to Polva Nederland B. V., Netherlands

Continuation of Ser. No. 610,568, Sept. 5, 1975, abandoned. This application Feb. 1, 1977, Ser. No. 764,590

Claims priority, application Netherlands, Sept. 13, 1974, 7412153

Int. Cl.² F16L *5/00*

U.S. Cl. 285—197 **6 Claims**



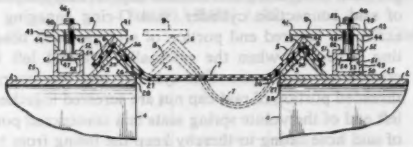
1. Branch connection for a pipe, which comprises a saddle-shaped part having an internally screw-threaded tubular member integral with said part a tee piece having an external screw thread which engages with the aforementioned screw thread and has the same pitch, and a sealing member which in the mounted condition is positioned between the inner surface of the tubular member and the outer surface of the tee piece, characterized in that the sealing member is located between concentric circular cylindrical wall portions of the tubular member and the tee piece which lie between the screw threads present thereon and those ends of the member and of the tee piece which are nearer to the pipe.

4,059,292

EXPANSIBLE COUPLING

Raymond E. Skates, 1612 Grand Ave., Kansas City, Mo. 64106

Filed July 12, 1976, Ser. No. 704,189
Int. Cl.[2] F16L *51/02*
U.S. Cl. 285—229 9 Claims



1. An expansible coupling for sealingly joining first and second duct ends, said coupling comprising:

a. first and second elongate rim members adapted for attachment to said first and second duct ends respectively, and having an outer surface;

b. first and second elongate clamping members, each of said clamping members having an inner surface thereof cooperatively mating with the outer surface of said first and second rim members respectively, one of said surfaces of said first rim and clamping members being a channel disposed longitudinally therein and one of said surfaces of said second rim and clamping members being a channel disposed longitudinally therein;

c. a flexible seal member having a pair of opposing marginal edge portions respectively clamped between the outer and inner surfaces of said first and second rim and clamping members;

d. means urging said rim and clamping members together;

e. said first and second rim members have an inverted V-shaped configuration;

f. said channel in said first and second clamping members is V-shaped;

g. said urging means comprises a plurality of clamps for positioning intermittently about each of said duct ends, said clamps being divided into first and second sets associated with said first and second duct end respectively;

h. each of the clamps of said first set includes:

1. a bar having a first end thereof engaging an outer portion of said first clamping member and a second end thereof being positioned rearwardly of said first clamping member, having a leg portion depending therefrom for engaging said first duct end, and supporting said bar second end in a spaced apart relation with said first duct segment, each of said bars having a transverse aperture therethrough disposed between the first and second ends thereof; and

2. fastening means positioned through said aperture and having a first end thereof for connection with said first duct end and a second end thereof engaging said bar and pulling inwardly thereon; and

i. said clamps of said second set being substantially similar to the clamps of said first set.

4,059,293

CONNECTOR

Clarence L. Sipler, Edgehill Road, Box 611, R.R. 1, Furlong, Pa. 18925

Filed Dec. 1, 1975, Ser. No. 636,438
Int. Cl.[2] F16L *21/00*
U.S. Cl. 285—236 6 Claims

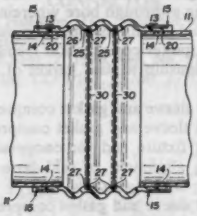
1. A connector for joining together two rigid hollow tubular members which comprises

a flexible casing with tubular end portions for engagement with the tubular members and having a wall portion therebetween with exterior and interior surfaces,

said wall portion having

at least one integral reinforcement member extending around the circumference of the wall portion and disposed intermediate said end portions,

a circumferential groove in said member between the exterior and interior faces of said wall portion of said casing and communicating with the interior of the wall portion through said interior surface,



said groove having interior integral marginal flaps extending toward each other along each edge thereof, and

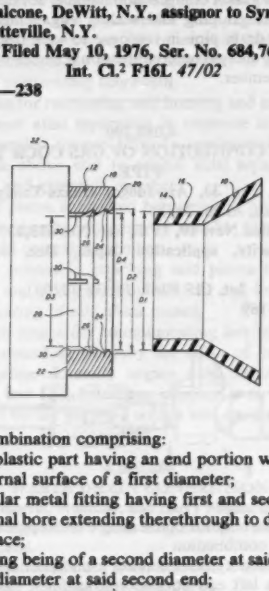
a rigid O-ring carried in said groove and retained therein by said flaps.

4,059,294

ANNULAR METAL FITTING FOR RIGID PLASTIC PART

Joseph R. Falcone, DeWitt, N.Y., assignor to Syracuse Plastics, Inc., Fayetteville, N.Y.

Filed May 10, 1976, Ser. No. 684,765
Int. Cl.[2] F16L *47/02*
U.S. Cl. 285—238 5 Claims



1. The combination comprising:

a. a rigid plastic part having an end portion with a cylindrical external surface of a first diameter;

b. an annular metal fitting having first and second ends and an internal bore extending therethrough to define an internal surface;

c. said fitting being of a second diameter at said first end and a third diameter at said second end;

d. said internal surface sloping inwardly from said first end, around the entire periphery thereof, at a predetermined angle of between 8° and 18° to a fourth diameter, said first diameter being smaller than said second diameter and larger than said third and fourth diameters, said fourth diameter being larger than said third diameter;

e. said internal surface extending radially outward from said fourth diameter to a diameter equal to said second diameter, thence sloping inwardly at substantially said predetermined angle to said third diameter, thence extending radially outward to said second diameter, thence sloping inwardly at substantially said predetermined angle to said third diameter, thence extending axially at said third diameter to said second end, thereby forming a plurality of teeth and grooves; and

f. ultrasonic welding means for permanently joining said

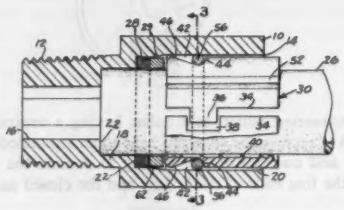
plastic part and metal fitting with said external surface opposing said internal surface over the entire area of the latter, whereby high frequency vibrations causes friction between the metal fitting and the plastic part which generates sufficient heat to soften the plastic part to flow around the teeth and into the grooves.

4,059,295

TUBE COUPLING

Homer E. Helm, Troy, Mich., assignor to Gordon H. Cork, Birmingham, Mich.

Filed Nov. 12, 1976, Ser. No. 741,235
Int. Cl.² F16L *21/06*
U.S. Cl. 285—305 **10 Claims**



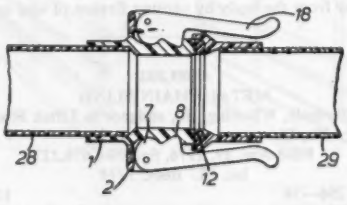
1. A releasable tube coupling comprising a body having a bore extending axially therethrough, said bore having an open end for receiving said tube, a resilient, annular tube clamping sleeve in said bore, said sleeve having a central bore through which the tube is adapted to be inserted, said sleeve being circumferentially contractible to cause the bore thereof to tightly grip the outer cylindrical surface of the tube, said body having a pair of apertures extending therethrough in a direction transversely of the axis of the bore, said apertures intersecting said bore and being spaced apart symmetrically with respect to the axis of the bore, the outer surface of said sleeve having a pair of diametrically opposed, radially outwardly inclined cam surfaces thereon, said cam surfaces being aligned one with each of said apertures and clamp means extending through said apertures and engaging said cam surfaces such that the inner periphery of the sleeve at least frictionally engages the tube inserted therethrough, said apertures restraining movement of said clamp means in a direction axially of the bore and radially outwardly of the bore, whereby, when an axially outward force is applied to the tube, said clamp means bear against said cam surfaces and exert radially inwardly directed force against said sleeve to more firmly grip the tube.

4,059,296

QUICK-ACTION COUPLING FOR PIPES OR TUBES

Constantin George Panourgias, Moschaton, Piraeus, Greece, assignor to Hellenic Plastics and Rubber Industry, Moschaton, Piraeus, Greece

Filed Nov. 11, 1975, Ser. No. 630,895
Claims priority, application Greece, Nov. 12, 1974, 239
Int. Cl.² F16L *37/18*
U.S. Cl. 285—312 **1 Claim**



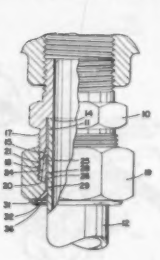
1. A quick-action pipe or hose coupling comprising a male plastics sleeve member and a female plastics sleeve member said members having free ends for attachment to respective free ends of first and second pipes or hoses to be coupled together and said male sleeve member having an opposite end for engagement with an internal annular sealing surface on said female sleeve member, said female sleeve member being shaped to receive said male sleeve member and having pivotally attached thereto a pair of diametrically opposed levers which can swing between locking and unlocking positions, the exterior of said male sleeve member having an annular recess of arcuate cross-section and an annular V-shaped groove axially spaced from said recess and disposed between the latter and said opposite end of said male sleeve member, one wall of said groove providing a planar generally upright abutment surface which faces toward said recess, each of said levers including a first projection shaped to cooperate with said recess in said male sleeve member so that upon swinging movement of said levers toward their locking positions the sleeve members are urged toward each other, each of said levers including a V-shaped projection having a planar surface which engages said abutment surface when the lever is in its locking position to prevent axial separation of the sleeve members.

4,059,297

TUBE COUPLING

Darwin R. Grahl, and Cary Haramoto, both of Newark, N.Y., assignors to Parker-Hannifin Corporation, Cleveland, Ohio

Filed Mar. 8, 1976, Ser. No. 664,532
Int. Cl.² F16L *19/08*
U.S. Cl. 285—340 **1 Claim**



1. A coupling for tubes comprising a body having a bore for receiving a tube, a nut, adjustable interengaging means on the nut and body operable for moving the nut toward the body, said nut and body when interengaged forming a chamber closed at its axially outward end, a deformable sleeve within said chamber, said nut and sleeve each having a bore for receiving the tube, said sleeve being engageable with the nut and body so as to be actuated and deformed thereby into gripping engagement with the tube, and a metal member carried by the nut axially outwardly of said chamber and being operable independently of actuation of the sleeve for engaging and holding the tube within the nut and sleeve prior to actuation and deformation of the sleeve into gripping engagement with the tube, said sleeve providing the main grip upon the tube when deformed by the nut as aforesaid said member being spaced from said sleeve and at all times out of contact therewith.

4,059,298

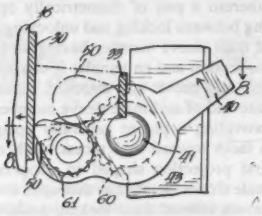
WINDOW LOCK

Marlo G. Van Klompenburg, Owatonna, Minn., assignor to Truth Incorporated, Owatonna, Minn.

Filed Sept. 27, 1976, Ser. No. 727,257
Int. Cl.² E05C *3/08*
U.S. Cl. 292—199 **10 Claims**

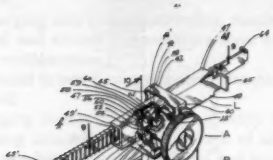
1. A lock having a casing and a separate keeper with spaced-apart members for locking to the casing, a cam finger engageable with one of said keeper members to draw said keeper

toward the casing and lock the keeper to the casing and engageable with the other keeper member to initiate movement of the keeper from the casing, a handle mounted on said casing for pivotal movement about a pivot axis and having means thereon defining a second axis movable by handle pivoting to and from a position between said spaced-apart members, means



mounting said cam finger on said handle for rotation about said second axis remote from said pivot axis, and means operable during pivoting of said handle and bodily movement of said cam finger to cause rotation of the cam finger about said second axis from a position pointing toward one keeper member to a position pointing toward the other keeper member.

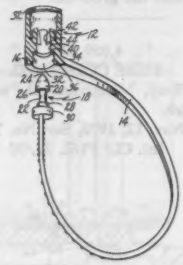
4,059,299
AUXILIARY PORTABLE LOCK
Orville P. Huntley, 15254 Calle Juanita, San Diego, Calif. 92129
Filed Mar. 3, 1976, Ser. No. 663,542
Int. Cl.[2] E05C *19/18*
U.S. Cl. 292—294 **14 Claims**



1. An auxiliary door lock comprising a lock body having means defining a casing, means defining a housing receiving said lock body casing for rotational movement of the latter within the former, means latchably interengaging said casing and said housing in selected relative position, an elongated element engaged to said casing for axially linear movement responsive to rotation of said casing, means defining a sleeve rigid with said housing and having its major axis normal to the longitudinal axis of said lock body, a toothed member freely extending through said sleeve for projection at its ends therebeyond, and cooperating means comprising a component carried on said elongated element interengageable with said toothed member for maintaining same in selected relative position in said sleeve, and means provided on one end of said toothed member engageable with the door to be locked.

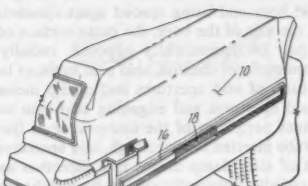
4,059,300
SEAL
Sigurd Manfred Moberg, Orange, and George A. Lundberg, Pompton Lakes, both of N.J., assignors to E. J. Brooks Company, Newark, N.J.
Filed Nov. 12, 1975, Ser. No. 630,965
Int. Cl.[2] B65D *63/00*
U.S. Cl. 292—322 **3 Claims**

1. The method of making a locking seal, comprising the steps of molding a seal blank having an elongated housing open at both ends and an integral shackel extending therefrom, said shackle having a stud on the remote end with an enlarged head forming a rearwardly facing shoulder, said housing having a series of fingers disposed therein having free ends spaced from the internal surface of the housing and extending toward one end of the housing, assembling into said one end of the housing



a stud centering collar, said collar having a central opening adapted to receive the enlarged head of an assembled stud, and closing said one end of the housing to confine the collar between the free ends of the fingers and the closed end.

4,059,301
MOLDING RETAINER
Engelbert Anthony Meyer, Bloomfield Hills, Mich., assignor to USM Corporation, Boston, Mass.
Filed June 1, 1976, Ser. No. 691,283
Int. Cl.[2] B60R *19/00*
U.S. Cl. 293—62 **11 Claims**



1. In an automobile body and bumper assembly wherein relative movement takes place between a body panel and bumper, each of which carries a portion of an aligned molding thereon, the improvement comprising;

a resilient member for receiving the molding on the body panel in engagement therewith near the body molding end adjacent the aligned molding portion on the bumper, and means affixing said resilient member to the automobile body panel whereby movement of the bumper relative to the body is effective to cause the body molding to move away from the body by causing flexure of said member.

4,059,302
METAL CHAIN SLING
George Barthule, Wheeling, Ill., assignor to Liftex Slings, Inc., Libertyville, Ill.
Filed Apr. 19, 1976, Ser. No. 678,227
Int. Cl.[2] B66C *1/18*
U.S. Cl. 294—74 **12 Claims**

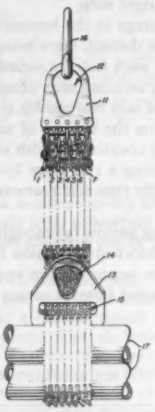
1. A sling comprising:

a plurality of metal chains placed in side-by-side parallel arrangement,

a metal terminal at each end of the sling, with both ends of at least some of the chains being connected thereto,

the metal chains being positioned with the links in a plurality of rows lateral to the length of the sling,

the links in even-numbered rows being at an angle of approximately 45°, and the links in the odd-numbered rows being at an angle of approximately 135°, from the top bearing surface of the sling, and with the links in each row being at an angle of approximately 90° with respect to the links in each adjoining row, and



a flexible metal cable threaded in a serpentine manner through the center of all the links in an odd-numbered row, looped back and threaded through the center of all the links in the adjoining even-numbered row, then looped back and threaded through the center of all the links in the adjoining next highest odd-numbered row, then looped back and threaded through the center of all the links in the adjoining next highest even-numbered row, and then looped and threaded back and forth through the adjoining rows of links in the described serpentine manner for most of the length of the sling.

4,059,303

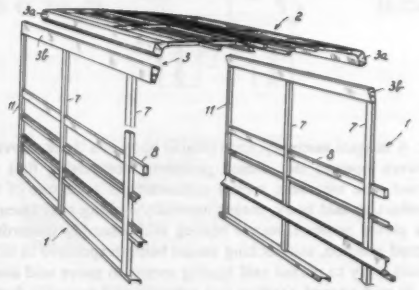
LIGHT ALLOY BODY STRUCTURE, PARTICULARLY FOR TRANSPORT VEHICLES, AND A PROCESS FOR ITS FORMATION

Ambrogio Mauri, Via Garibaldi, 254, Desio, (Milan), Italy

Filed Mar. 2, 1976, Ser. No. 663,163

Int. Cl.[2] B62D *33/00*

U.S. Cl. 296—28 M **2 Claims**



1. A light alloy body structure having a longitudinal extension, a widthwise extension and an upward extension, particularly for transport vehicles, including a top structure having opposite composite longitudinal side edge longeron members, opposite side wall structures fixed respectively on said composite longitudinal side edge longeron members, a front wall structure and a rear wall structure, wherein said composite side edge longeron members comprise each a first and a second elongated shaped hollow box section member having each a reinforcing inner cross-piece like web, a mating longitudinal edge surface on each of said box section members facing each other and having longitudinally extending mating tongue and groove formations for rapid assembling and for rigid mutual connecting therewith, said first shaped hollow box section member having a generally arcuated cross-section with an upper and a lower portion, said upper portion extending in alignment with said top structure and being rigidly connected therewith thereby to form a rigid unit therewith, said lower portion extending in alignment with the respective side wall structure and being rigidly connected therewith thereby to form a rigid unit therewith and means for rigidly connecting said front wall structure and said rear wall structure with said opposite side wall structures.

4,059,304

ENERGY ABSORBING APPARATUS FOR VEHICLES

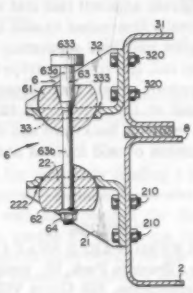
Akira Yamanaka, Yokohama, Japan, assignor to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Japan

Filed Jan. 9, 1976, Ser. No. 647,913

Claims priority, application Japan, Jan. 14, 1975, 50-7894[U]

Int. Cl.[2] B62D *1/00*; F16F *7/12*

U.S. Cl. 296—35 R **16 Claims**



1. Impact force absorbing apparatus for vehicles, comprising:

a die-supporting bracket member disposed to be rigidly mounted on a first portion of a vehicle, the bracket member having means defining a die bearing surface;

a die element having a die hole and having a curved die body surface which constitutes a surface of rotation of a generatrix, the die element being swingably supported by the die bearing surface and that surface being similar to a portion of the die body surface;

a guide-supporting bracket member disposed to be rigidly mounted on a second portion of the vehicle, the latter member having means defining a guide bearing surface;

a guide element having a guide hole and having a curved guide body surface similar to the die bearing surface; and

an elongate, drawable and plastically deformable member having, in axial succession, a large-diameter portion extending from one end of the die hole and a small-diameter portion extending through the die hole and into, through and from the guide hole, the deformable member being fastened to the guide element, remotely from the die element;

whereby, when an impact force exceeding a given value moves the first portion relative to the second portion of the vehicle, both elements turn on their respective bearing surfaces and subject the deformable member to plastic

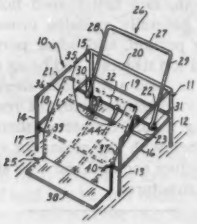
deformation by drawing the large-diameter portion into the die hole to absorb the impact force.

4,059,305

SEAT AND FOOT REST TILTING CHAIR

Vincent T. Ammirata, 7 The Terrace, Middletown, N.J. 07748

Filed Dec. 30, 1975, Ser. No. 645,466
Int. Cl.[2] A47C *1/02*
U.S. Cl. 297—338 3 Claims



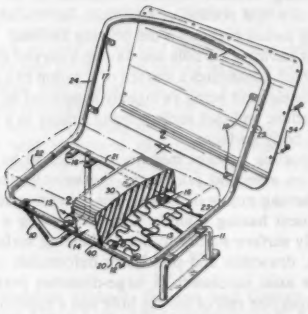
1. An invalid chair for holding a patient in a sitting position comprising a single rigidly connected chair base frame formed with four upright supports joined in a square relationship by side, front and back rails and provided with a seat support rail, two side arm support rails connected to said four upright supports as a part of said single rigid frame, a cross bar extending between said side rails adjacent said seat support rail and a back rest frame pivotally connected to said crossbar, a single rigidly formed footrest and seat supporting frame pivotally mounted to said front rail, and resilient straps connected at one end to the footrest portion of said footrest and seat supporting frame and connected at the other end to said cross bar, whereby said straps resist the backward and downward movement of said seat portion of said footrest and seat supporting frame.

4,059,306

SEAT WITH REMOVABLE SEAT CUSHION

Arthur J. Harder, Jr., Franklin Park, Ill., assignor to Coach and Car Equipment Corporation, Elk Grove Village, Ill.

Filed July 26, 1976, Ser. No. 708,480
Int. Cl.[2] A47C *5/06*
U.S. Cl. 297—452 7 Claims



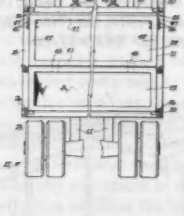
1. In a seat;
a seat frame including front and rear frame members;
serpentine spring means located between said front and rear frame members;
a plurality of brackets extending rearwardly from said front frame member;
an elastically deformable seat cushion resting atop and supported by said serpentine spring means;
a narrow, rigid, non-elastic strip attached to the bottom of said seat cushion at the front end thereof and overlying said brackets;
a plurality of threaded fastener means fixedly mounted on said rigid strip;
a removable fabric cover completely enclosing said cushion;
said fabric cover comprising a bottom underlying the entire bottom of said cushion and having a front end portion underlying said rigid strip;
a plurality of openings in the bottom of said cover at the front end portion thereof, there being an opening for, and in registry with, each fastener means on the rigid strip;
threaded means for securing each of said fastener means to a respective one of said rearwardly extending brackets;
and zipper means on the bottom of said cover, said zipper means extending coextensive with said rigid strip;
said rigid strip having a rear edge located substantially no further rearwardly than said rearwardly extending brackets;
said rigid strip being narrow (a) enough to permit removal of the elastically deformable cushion from within it cover when said zipper means is open and (b) wide enough to mount said threaded fastener means thereon.

4,059,307

VEHICLE TAILGATE ASSEMBLY

Jacob J. Neufeldt, Box 597, Lethbridge, Alberta, Canada (T1J 3Z4)

Filed Sept. 16, 1976, Ser. No. 723,910
Claims priority, application Canada, Oct. 1, 1975, 236797
Int. Cl.[2] B60P *1/26*
U.S. Cl. 298—23 R 8 Claims



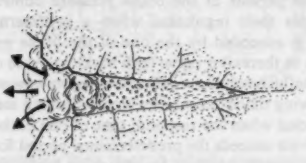
1. A tailgate assembly, for a tiltable body of a truck, movable between opened and closed positions, comprising first and second gate members, means connecting at least one of said members to said body, means normally locking said assembly in a closed position, means biasing said assembly towards an opened position, said locking means being responsive to tilting of said body to permit said biasing means to move said assembly to said opened position and wherein said assembly further includes a third gate member pivotally connected at its lower edge to said body, said third gate member having its upper edge abutting the lower edge of said second gate member, and means for maintaining said third gate in a closed position.

4,059,308

PRESSURE SWING RECOVERY SYSTEM FOR OIL SHALE DEPOSITS

Durk J. Pearson, Palos Verdes Estates, and Jack R. Bohn, Rancho Palos Verdes, both of Calif., assignors to TRW Inc., Redondo Beach, Calif.

Filed Nov. 15, 1976, Ser. No. 741,637
Int. Cl.[2] E21C *41/10*
U.S. Cl. 299—5 18 Claims



1. A process for the in-situ recovery of hydrocarbon values and associated minerals from subsurface oil shale deposits in which a gas-tight retort chamber can be produced comprising the steps of:

a. drilling into said oil shale deposits;

b. injecting steam into said shale deposits at varying pressures cycled over a predetermined time to dissolve and extract said associated minerals which are water soluble thereby forming a substantially gas-tight chamber;

c. injecting hot, non-oxidizing gas into said shale deposit at varying pressures cycled over a predetermined time in said chamber whereby said associated minerals are decomposed and hydrocarbon fluids extracted;

d. injecting a solvent-surfactant into said deposit at varying pressures cycled over a predetermined time and extracting said decomposed minerals and hydrocarbon fluids;

e. removing said solvent-surfactant from said deposit;

f. instituting a flame front and injecting air and water at varying pressures cycled over a predetermined time to combust hydrocarbon residue to produce liquid and gaseous hydrocarbons, CO, and H_2; and

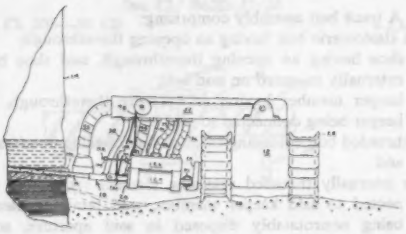
g. filling said chamber with a fluid selected from the group consisting of water, aqueous solutions, and aqueous slurries.

4,059,309

APPARATUS AND METHOD FOR CUTTING ELONGATED SLOTS IN EARTH FORMATIONS

James M. Cleary, 92 McCallum Drive, Falmouth, Mass. 02541

Continuation-in-part of Ser. No. 461,301, April 16, 1974, Pat. No. 3,917,349, and Ser. No. 519,648, Oct. 31, 1974, abandoned, which is a continuation-in-part of Ser. No. 461,301,. This application Aug. 12, 1975, Ser. No. 604,055
Int. Cl.[2] E21C *47/00*
U.S. Cl. 299—18 11 Claims



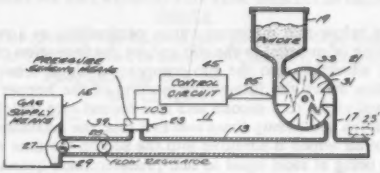
1. Apparatus for cutting in earth formations a deep slot having a large depth to thickness ratio comprising; a long support means disposed adjacent the advancing edge of the slot and extending from outside the slot to its full depth; cutting means guided on the forward side of said support; a passage extending the full length of the support adapted to discharge a fluid into said forward clearance to flush material from the slot; a second passage extending from outside the slot along the support to an intermediate depth for discharging paste mixture into the excavated region at the rear under pressure which acts on the sides of the slot preventing the slot from closing on the support and which acts on the rearward facing area of thes support providing the force required to move the support forward against the advancing edge of the slot; projections on the forward portion of said support making close contact with both sides of the slot to its full depth so as to prevent the flow of paste mixture from the excavated region at the rear of the support into the forward clearance; and motive means coupled to the outer end of said support supplying guidance and control to the support, supplying paste and fluid under pressure to said passages, and supplying energy to said cutting means.

4,059,310

APPARATUS AND METHOD FOR UNIFORM POWDER FEED

John J. Waskiewicz, Wauwatosa, and John H. Winston, Menomonee Falls, both of Wis., assignors to Outboard Marine Corporation, Waukegan, Ill.

Filed July 16, 1973, Ser. No. 379,361
Int. Cl.[2] B65G *53/66*
U.S. Cl. 302—42 12 Claims



12. Apparatus for uniformly feeding a substance into a carrier gas, said apparatus including a carrier gas conduit, a duct communicating with said conduit for feeding the substance into the conduit, means for supplying into said conduit upstream of said duct, a flow of carrier gas which is maintained under a constant pressure condition above atmospheric prior to supply into said duct, a feed device communicating with said duct and operable at a variable feed rate to supply the substance through said duct to said conduit for delivery in said conduit solely in response to the introduction of carrier gas, means for sensing one of the conditions in said conduit, and means connected to said condition sensing means for maintaining a uniform feed of the substance into the carrier gas flowing in said conduit by varying the feed rate of said feed device in accordance with variation of said one condition in said conduit.

4,059,311

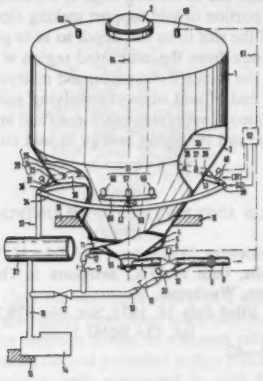
PROCESS FOR DISCHARGING BULK MATERIAL FROM A SILO

Artur Spitzer, Mosbach, Baden; Hartmut Biedert, Sulzbach, both of Germany, and Fritz Gramlich, deceased, late of Mosbach, Baden, Germany (by Ute Gramlich, legal representative), assignors to Spitzer Silo-Fahrzeugwerk KG, Mosbach, Baden, Germany

Filed Apr. 27, 1976, Ser. No. 680,663
Claims priority, application Luxembourg, Apr. 30, 1975, 72387
Int. Cl.[2] B65G *53/66, 53/38*
U.S. Cl. 302—53 8 Claims

1. A process for evacuating pneumatically conveyable bulk material from the downwardly tapering hopper of a silo into a pneumatic conveyor line whose capacity to effectively convey material from the silo is limited by a predetermined maximum

quantity of air flowing therethrough per unit of time and which communicates with a foraminous portion of the hopper, comprising the steps of continuously admitting compressed air through the foraminous portion of the hopper at a first rate per volume to loosen the material in the hopper and to effect the entry of material into and the evacuation of material through the conveyor line as long as the pressure in the silo is between a predetermined maximum and a predetermined minimum value; closing the conveyor line when the pressure in the silo



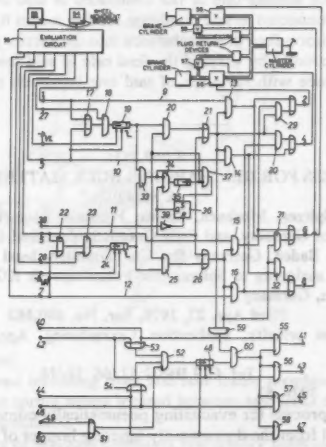
drops below said minimum value, particularly as a result of bridging of material in the silo and/or the formation of chimneys; admitting into the silo compressed air at least at one location above the foraminous portion of the hopper for an interval of 0.5 to 1 second and at a second rate which is between ten and twenty times said first rate, the maximum quantity of air which is admitted into the silo on the time average basis being at most equal to said predetermined quantity; and opening the conveyor line when the pressure in the silo rises above said minimum value.

4,059,312

ANTI-LOCKING CONTROL SYSTEM

Wolf-Dieter Jonner, Sandhausen, Germany, assignor to Teldix GmbH, Heidelberg, Germany

Filed Sept. 24, 1976, Ser. No. 726,276
Claims priority, application Germany, Sept. 27, 1975, 2543178
Int. Cl.² B60T *8/00*
U.S. Cl. 303—92 **7 Claims**



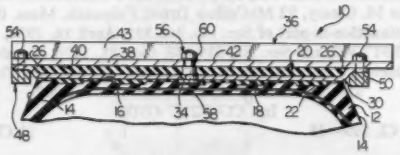
1. In an anti-locking control system for independently regulating the brake pressure to the brakes of two wheels on one axle, which system includes wheel movement sensors for determining the movement behavior of each of these wheels and for generating corresponding signals, an evaluation circuit connected to process these signals and to generate control signals, two brake pressure control devices each arranged to receive these control signals for the individual regulation of the brake pressure at a respective one of the two wheel brakes, and a monitoring device which independently monitors the response periods of the brake pressure control devices and interrupts their regulation when a predetermined response period is exceeded by the one of the brake pressure control device, to thereafter cause both brake pressure control devices to be influenced identically, the improvement wherein said monitoring device comprises first switching means connected to respond when the response time of one brake pressure control device exceeds the predetermined period for supplying the control signals destined for the other brake pressure control device to the corresponding inputs of the first brake pressure control device, and second switching means including: a timer connected to be actuated, to produce an output signal having a preselected duration, when both brake pressure control devices have responded for longer than the predetermined response period; and means connected to the output of said timer for causing the control signals generated by the evaluation circuit to be applied to their respective control devices for the preselected duration of the output signal from said timer and for blocking the delivery of control signals to the brake pressure control device after termination of the output signal from said timer.

4,059,313

TRACK BELT ASSEMBLY

Marvin E. Beyers, and Floyd S. Dadds, both of Peoria, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Sept. 27, 1976, Ser. No. 727,189
Int. Cl.² B62D *55/28*
U.S. Cl. 305—19 **5 Claims**



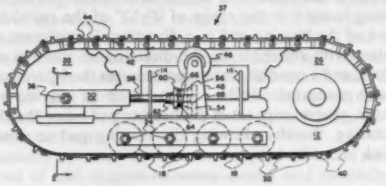
1. A track belt assembly comprising:
an elastomeric belt having an opening therethrough;
a shoe having an opening therethrough, said shoe being externally mounted on said belt;
a keeper member having an aperture therethrough, said keeper being connected to said belt;
a threaded bolt extending through said opening in said shoe; and
an internally threaded retaining element removably connected to said keeper member, said retaining element being nonrotatably disposed in said aperture, screw threadably receiving said bolt therein, and allowing said shoe and said keeper member to be drawn clampingly together and tightly to said belt, said retaining element extending through said opening in said belt and maintaining a preselected spacing between said shoe and said keeper member.

4,059,314

TRACK ASSEMBLY FOR TRACKED VEHICLES

Jacob Amstutz, P.O. Box 320, Canby, Oreg. 97013

Filed Feb. 27, 1976, Ser. No. 662,212
Int. Cl.[2] B62D *55/30*
U.S. Cl. 305—31 2 Claims



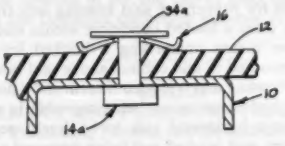
1. A track assembly for a tracked vehicle comprising:
a. a vehicle frame extending longitudinally of said vehicle;
b. first and second track sprockets journaled at longitudinally-spaced positions on said frame so as to rotate about respective axes transverse to said frame;
c. an endless track trained about said track sprockets;
d. journaling means having said first track sprocket journaled therein, said journaling means being movably attached to said frame for permitting said first track sprocket to reciprocate in a longitudinal direction;
e. an elastomeric bushing of resilient elastomeric material compressively interposed between said journaling means and said vehicle frame for permitting the movement of said first track sprocket longitudinally in a direction toward said second track sprocket while resisting said movement by a reactive compressive force of said elastomeric material variable in response to the degree of said longitudinal movement;
f. said journaling means having a compression member extending therefrom toward said second sprocket, said compression member having first bushing engagement means mounted adjacent its extended end facing said second sprocket for engaging one side of said elastomeric bushing and threaded means for adjusting the longitudinal position of said first bushing engagement means on said extended end of said compression member, said vehicle frame having a mating bushing engagement means mounted thereon facing said first bushing engagement means for engaging the opposite side of said bushing, said elastomeric bushing being located between said two bushing engagement means.

4,059,315

CLEAT ANCHOR FOR FLEXIBLE VEHICLE TRACK

James D. Jolliffe, 4844 Kimball, S.E., Grand Rapids, Mich. 49508, and Allen D. Sessions, 919 Arhana Crest Drive, Middleville, Mich. 49333

Filed Jan. 2, 1976, Ser. No. 646,236
Int. Cl.[2] B62D *55/28*
U.S. Cl. 305—35 EB 4 Claims



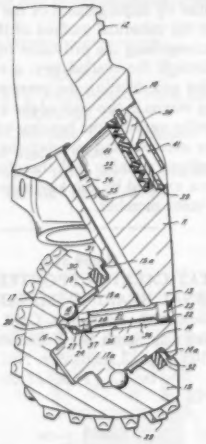
2. A flexible track for a snowmobile, said track having an endless flexible web and a traction providing cleat, at least one anchor plate for attaching said cleat to said flexible web, said anchor plate being rectangular and having a main body and flanges along at least two opposite side edges of said plate, said flanges being arranged normal to the direction of movement of said web and extending substantially normal to the plane of said plate; the juncture between said flanges and said body being smoothly rounded to provide a rolling contact with the flexible web when said plate is rocked relative to the flexible web; an opening for a fastener at the approximate geometric center of said plate, said body surrounding said opening being offset in the direction of extension of said flanges to form a concave pocket in the face of said plate opposite from said flanges, said plate being seated against the face of said flexible web opposite from said cleat with said pocket facing said web; a fastener passing through said cleat, web and said plate and squeezing said cleat and plate together to compress said web between said cleat and said plate sufficiently to deform said web to fill said pocket and press the web firmly against the portion of the fastener passing therethrough.

4,059,316

BEARING RETAINING PIN FOR EARTH BORING DRILL

Joseph A. Alvarez, San Antonio, and Robert J. Mills, Houston, both of Tex., assignors to Reed Tool Company, Houston, Tex.

Filed June 21, 1976, Ser. No. 697,810
Int. Cl.[2] F16C *19/00*
U.S. Cl. 308—8.2 4 Claims



1. A roller cutter earth boring bit comprising:
a bearing shaft arranged on said bit,
a roller cutter mounted on said shaft,
a peripheral bearing race on said shaft,
a peripheral bearing race on the inner surface of said cutter and cooperating with said first named bearing race,
a plurality of ball bearings positioned between said bearing races,
a passageway in said shaft extending to said first named bearing race for introduction of ball bearings thereto,
a bearing retaining pin secured in said passageway and having an end portion with a symmetrical surface curvature fitting the curvature of said first named bearing race to secure said ball bearings therein.

4,059,317

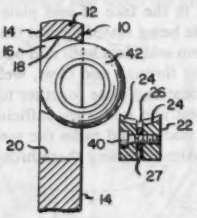
SPHERICAL BEARING WITH SLOTTED KEY

Albert R. McCloskey, Fairfield, Conn., assignor to The Heim Universal Corporation, Fairfield, Conn.

Continuation of Ser. No. 531,899, Dec. 12, 1974, abandoned. This application Nov. 17, 1975, Ser. No. 632,560

Int. Cl.² F16C *23/00*

U.S. Cl. 308—72 **8 Claims**



1. A spherical bearing comprising an outer member having a hole extending from side to side, the surface of the hole being concave and spherical so that the outer member has constricted portions at each side, the outer member also having a walled keyway extending downward from the hole and extending axially from side to side of the outer member substantially perpendicular to the sides of the outer member; a walled key in the keyway co-extensive with the keyway, the key also having a concave and spherical top surface corresponding to the surface of the hole so that the key has shoulder portions corresponding to the constricted portions of the outer member; and a partially spherical inner member havng flat sides, the inner member being held in the outer member by impingement of the spherical surface of the inner member against the constricted portions of the outer member and the key being held in the outer member by impingement of the shoulder portions of the key against the spherical surface of the inner member the improvement comprising the provision of a radial slot extending entirely through the walled key, a resilient member disposed in said slot and abutting the inner surface of each of the walls, adjusting means in the wall of the key to vary the width of the slot thereby varying the bearing tolerance between the inner and outer member and varying the degree of compression of said resilient member and therefore the degree of the preloading force exerted by the key member on the spherical surface of the inner member.

4,059,318

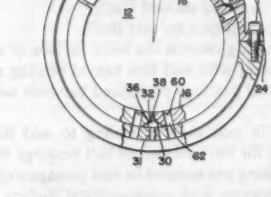
HYDROSTATICALLY SUPPORTED TILTING PAD JOURNAL BEARING IMPROVEMENTS

Leon W. Hollingsworth, La Habra, Calif., assignor to Pioneer Motor Bearing Co., South San Francisco, Calif.

Filed Sept. 2, 1976, Ser. No. 719,755

Int. Cl.² F16C *17/06*

U.S. Cl. 308—73 **9 Claims**



1. An improved tilting pad journal bearing for supporting a rotatable shaft and having a plurality of bearing pad segments that are hydrostatically supported by a hydrodynamically generated oil film and carrier means for supporting the bearing pad segments in surrounding relation to the shaft, the improvement comprising:

a bearing pad having a pair of opposed ends, an inner face, an outer face, an elongated circumferentially extending cavity in the outer face, the radial center line of the cavity being located in the range of 0°–12° of the radial center line of the bearing pad in a direction downstream of the latter with reference to the direction of rotation of the shaft, and a conduit that communicates the hydrodynamically generated oil film to the cavity to provide hydrostatic, pivotal support of the bearing pad when the shaft is rotating, thereby allowing the bearing pad to raise and rock about its center.

4,059,319

VENDING MACHINE

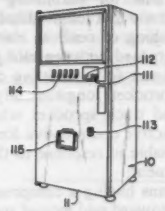
Kunitake Hatori, Maebashi, Japan, assignor to Sankyo Electric Company Limited, Isesaki, Japan

Filed Aug. 23, 1976, Ser. No. 716,834

Claims priority, application Japan, Aug. 23, 1975, 50-116423[U]; Mar. 16, 1976, 51-30700[U]

Int. Cl.² A47B *88/00, 95/00*

U.S. Cl. 312—319 **11 Claims**



1. In a vending machine including a cabinet with a front door and article storage means mounted within said cabinet, the improvement comprising:

at least one housing unit having a top end plate, a front end plate, and a rear end plate for storing articles to be vended,

an upper elongated guide member fixed on the top end plate of said housing unit and extending from a front end to a rear end thereof,

guide rail means mounted on an upper inside surface of said cabinet and extending from a front end to a rear end of said cabinet,

slidable guide means being slidably supported along said guide rail means, said slidable guide means slidably supporting and guiding said upper elongated guide member to permit the movement of said housing unit into and out from said cabinet,

guide groove means, mounted on a lower frame portion of said cabinet, extending from a front end to a rear end of said cabinet and positioned to receive and slidably guide said lower elongated guide member,

stopper means for preventing said housing unit from being withdrawn from a loaded condition within said cabinet, said stopper means comprising a hooked lever means pivotally mounted in said cabinet above said housing unit when said housing unit is loaded therein and a hooked end of said hooked lever means being movable in a vertical plane about a horizontal axis to be freely pendant by gravity force, said hooked end being arranged to fall into and to be received in a hole formed in said top plate of said housing unit to prevent the withdrawal of said housing unit from a loaded condition within said cabinet,

means for limiting the downward pendant movement of said hooked end of said hooked lever means to position a cammed surface of said hooked end for engagement with and for riding upon a top end plate of said housing unit in

response to a loading operation of said housing unit into said cabinet,

stopper releasing means provided in said housing unit for pushing said hooked end of said hooked lever means upwardly and out from said hole of said top end plate and said housing to release said stopper means, said stopper releasing means comprising a rod member mounted for free movement in the vertical direction between a lower rest position and an upper raised position, and a plate member provided at the upper end of said rod member, said plate member being disposed beneath said hole to urge said hooked end of said hooked lever means upwardly and out from said hole upon raising said plate member; and

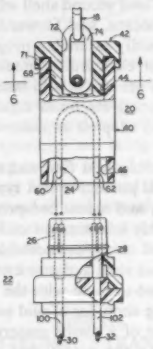
manually operated lever means coupled with said rod member of said stopper releasing means, said manually operated lever being exposed through the front end plate of said housing unit for operation from outside said housing means.

4,059,320

SAFETY PLUG UNIT

Robert E. Piaget, 11563 Grooms Road, Cincinnati, Ohio 45242

Filed Feb. 24, 1977, Ser. No. 771,545
Int. Cl.[2] H01R *31/08*; F16P *3/00*
U.S. Cl. 339—19 **7 Claims**



4. A safety plug unit which comprises a body, there being sockets in end portions of the body, there being a pair of bores connecting the sockets, a U-shaped connector member having arms which extend through the bores and a central portion exposed in a first one of the sockets, end portions of the arms being exposed in the second socket, there being aligned transverse openings in walls of said first socket, and end cap mounted in said first socket and engageable with the central portion of the U-shaped connector member to hold the U-shaped connector member in position, there being a transverse opening in the end cap and fastener means extending through the transverse opening in walls of the first socket and the transverse opening in the end cap to hold the body, the end cap, and the U-shaped connector member in assembled relation.

4,059,321

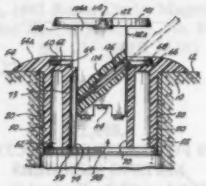
PULL-OUT RECEPTACLE FOR FLOOR DUCTS

Harry R. Rasmussen, Tacoma, and Kenneth D. Topel, Puyallup, both of Wash., assignors to Crest Industries, Inc., Puyallup, Wash.

Filed Oct. 18, 1976, Ser. No. 733,207
Int. Cl.[2] H01R *13/44*; H02G *3/22*
U.S. Cl. 339—34 **27 Claims**

1. A pull-out receptacle for floor ducts, said receptacle being adapted to be mounted in a floor aperture extending from a floor surface to and into the floor duct and being adapted when so mounted to permit access to be made to the floor duct and to electrical cables therein from the floor surface, said receptacle comprising:

a. sleeve means including an upper flange for overlying portions of the floor surface which are adjacent to the floor aperture; a lower wall means integral with and dependent from said flange and configured to be received within the floor aperture; a first recess being defined in said flange and extending inwardly into said sleeve means; a first aperture having a cross-sectional area which is less than the cross-sectional area of said first recess and being defined in said flange and in said wall means and extending



through said sleeve means, said first aperture communicating at one end thereof with said first recess; and, means for securing said sleeve means to the floor when mounted in the floor aperture; and

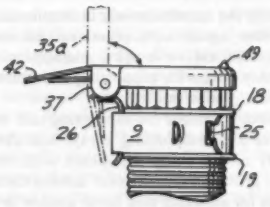
b. a closure member including a cap configured to be received in said first recess of said sleeve means; a core, integral with and dependent from said cap, which is configured to be received in said first aperture of said sleeve means with a reciprocative, sliding fit; a first passageway for electrical cables extending through said core and a second passageway for electrical cables extending through said cap and communicating with said first passageway.

4,059,322

DUST PROTECTIVE ASSEMBLY FOR BREAKAWAY CONNECTORS

Erwin J. Fellner, LaCrescenta, Calif., assignor to Sierra Engineering Co., Sierra Madre, Calif.

Filed Feb. 6, 1976, Ser. No. 655,869
Int. Cl.[2] H01R *13/44*
U.S. Cl. 339—44 R **1 Claim**



1. In combination: an electrical connector of the type having a hollow cylindrical peripheral wall terminating at an open end and containing electric contact means within said wall near said open end, adapted to engage mating contact means of an electric equipment; and a cover at said open end; said cover comprising:

a cylindrical band of elastomeric material around the peripheral wall adjacent said end;

a clamp comprising a cylindrical strip compressed around the exterior surface of said elastomeric band,

a string-loaded lid; and means pivotally attaching the lid to the clamp;

said lid having a notch at an angular position remote from said means pivotally attaching the lid to the clamp, which

registers with a keying tab protruding from the open end of the peripheral wall;

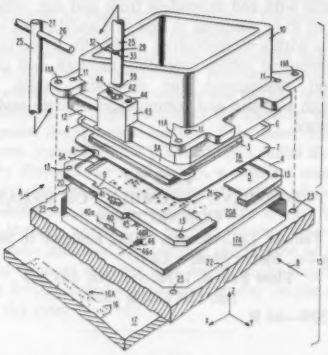
said lid being positioned so that it is held by the spring against said open end when the contact means of the connector is not engaged with any mating contact means, thereby preventing dust and dirt from entering said open end, but permitting said connector contact means to be engaged with such mating contact means by pivoting the lid against the force of the spring sufficient to uncover said open end.

4,059,323

APPARATUS FOR INTERCONNECTING PLURAL MATING MEMBERS

Robert Babuka, Vestal, and John Bernard Harris, Endicott, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 13, 1976, Ser. No. 685,951
Int. Cl.² H01R *13/54*
U.S. Cl. 339—75 M **10 Claims**



1. Apparatus for simultaneously interconnecting plural first mating member means with plural second mating member means in mutually exclusive pairs, said apparatus comprising:

first assembly means for supporting said plural first member means in a predetermined array,

second assembly means for supporting said second member means in a corresponding array, said first and second assembly means being juxtaposed with respect to each other to provide relative linear motion therebetween, and

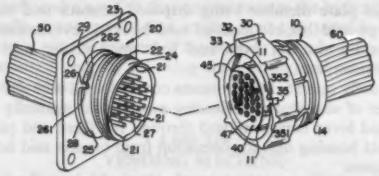
cam means for effecting said linear motion in a bidirectional manner in response to a rotational force applied thereto about a predetermined axis of rotation, said rotational force being applied in a given direction about said axis between first and second predetermined angular positions to provide said linear motion in a first linear direction to effect said interconnecting of said plural first and second mating member means, said rotational force being further applied in said given direction about said axis between said second angular position and a third predetermined angular position to provide said relative linear motion in an opposite second linear direction to relieve undesirable stresses when present in at least one of said first and second assembly means of said apparatus caused by the interconnection of said first and second plural member means.

4,059,324

ELECTRICAL CONNECTOR

Gene L. Snyder, Bainbridge, and Walter F. Hennessey, Jr., Sidney, both of N.Y., assignors to The Bendix Corporation, Southfield, Mich.

Filed Sept. 15, 1976, Ser. No. 723,410
Int. Cl.² H01R *13/54*
U.S. Cl. 339—89 M **9 Claims**



1. An electrical connector assembly comprising:

a first shell;

a first insulating insert mounted in said first shell, said insert having a plurality of axial passages therethrough;

a second shell having a forward and rearward portion, thread means on the forward portion of the outside of said second shell, and a forwardly facing shoulder located intermediate of said second shell adjacent the termination of said thread means, said forwardly facing shoulder including a forwardly extending projection;

a plurality of first electrical contacts, each mounted in a respective axial passage in said insert;

a plurality of second electrical contacts mounted in said second shell and adapted to mate with said first contacts; and

means for connecting said first and second shells together and holding said pin and socket type contacts together in mated position, said means comprising:

a sleeve rotatably mounted on said first shell, said sleeve having thread means connectable to the thread means on said second shell and a rearwardly extending notch that is adapted to mate with the projection on the forwardly facing shoulder of said second shell, said sleeve being formed of a plastic material which is resiliently deformable to the extent that the sleeve allows the projection on the second shell to mate with the notch in the sleeve, whereby when said first and second electrical contacts are placed in axial alignment and thrust towards each other and said sleeve is rotated in one direction, the threads in said sleeve connect to the threads on said second shell drawing the pin and socket contacts into mated relationship until said projection on said second shell engages the notch in said first shell.

4,059,325

TERMINAL PROTECTION SHIELD

Edward A. Diminnie, and Patrick J. Dellario, both of Louisville, Ky., assignors to General Electric Company, Louisville, Ky.

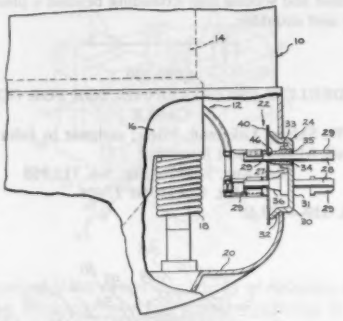
Filed Dec. 13, 1976, Ser. No. 749,726
Int. Cl.² H01B *17/26;* H01R *5/04;* H02H *7/08*
U.S. Cl. 339—94 A **3 Claims**

1. In a hermetically enclosed motor compressor assembly having a housing provided with an opening, an electric terminal having a cup-shaped metal body member including an area formed by an end wall and a circumferentially arranged side wall extending axially therefrom, said terminal being disposed in said opening with said area exposed to said housing, said end wall being provided with a plurality of spaced apertures, metal conductor pins arranged in said apertures substantially perpendicular to said end wall, one end portion of said conductor pin extending through said area to a position past the free end of said side wall, insulating seals hermetically sealing said pins to

adjacent portions of said end wall, the improvement comprising:

connector means including tabs secured on said conductor pins being dimensioned so that one end of said tab is adjacent the free end of said pin and having their other end spaced from said area a predetermined distance relative to a plane defined by the free end of said side wall,

a flexible shield member of dielectic material having a surface area at least equal to the area of said metal body member defined by said circumferentially disposed side wall;



a plurality of connector means receiving apertures arranged in said flexible shield member being equal in number and spacing to said connector means;

resilient latch means formed on said shield means adjacent said receiving apertures and being in alignment with said tabs for allowing passage of said shield member over said connector means including said tabs, and for latching under the other end of said tabs when said shield contacts the free end of said side wall for maintaining said shield against the free end of said side wall so that said area is isolated from said housing.

4,059,326

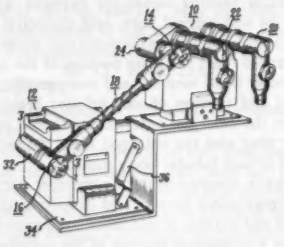
DRY-TYPE INSTRUMENT TRANSFORMER WITH POTENTIAL TAP AND CONNECTOR THEREFOR

Ronald J. Ouelette, Derry, N.H.; Robert S. Canney, Berwick, Maine, and Ralph B. Stetson, Exeter, N.H., assignors to General Electric Company, Somersworth, N.H.

Division of Ser. No. 458,704, April 8, 1974, Pat. No. 3,959,760. This application Mar. 1, 1976, Ser. No. 662,782

Int. Cl.² H01R *3/00*

U.S. Cl. 339—113 R **3 Claims**



1. An elbow module for use with an instrument transformer having a potential tap recess mounted in a well of the instrument transformer to provide a dead-front electrical connection which eliminates dangerous potentials at the point of connection, said elbow comprising:

a. a length of conductor for connection to the potential tap; and

b. an elongated insulating male member for insertion into the well of said instrument transformer, said insulating male member surrounding the length of said conductor except for a portion of said conductor which extends beyond one end of said insulating male member whereby said conductor is insulated from said transformer except at the point of connection of said conductor to the potential tap when said insulating male member is inserted into the well.

4,059,327

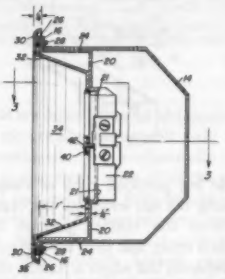
RECESSED ELECTRICAL OUTLET

Donald S. Vann, 1601 Karen Circle, Magnolia, Ark. 71753

Filed Apr. 1, 1976, Ser. No. 672,625

Int. Cl.² H01R *13/60*

U.S. Cl. 339—122 R **1 Claim**



1. A recessed electric outlet comprising; means for substantially improving both the appearance and the safety factor of electrical receptacles and wall mounts therefor including, an electric box mounted in a wall of a building and including top and bottom flanges at the front edge thereof for reception of electric house wiring, an electrical receptacle mounted within said electric box for permanent connection to said wiring, said box including generally parallel top and bottom walls, said receptacle being vertically elongated and disposed in perpendicular relation to the top and bottom walls and generally centrally between the front and rear edges of the top and bottom walls, mounting means for supporting said electric receptacle deep within the electric box, and cover and protecting means attached to the electrical receptacle for covering the open portion of said electrical box to prevent access to the wiring contained therein, said mounting means for the electric receptacle including a deep offset bracket mounted on the electrical receptacle, said bracket being in the form of a narrow rigid strap having portions perpendicular to the top and bottom walls of the box, forwardly extending portions in surface-to-surface engagement with the top and bottom walls of the box and outwardly extending flanges overlying and attached to the flanges on the box by screws, said cover and protecting means including a rectangular dish-like structure having a deep recessed center portion attachable to the electrical receptacle by a center screw provided therewith and having the outer circumferential edge of the structure overlying the front edge of the electric box, the flanges thereon and the adjacent wall surface.

4,059,328

MOUNTINGS FOR ELECTRICAL FIXTURES IN JUNCTION BOXES

Larry E. Rigo, P.O. Box 805, Marietta, Ga. 30061

Filed July 19, 1976, Ser. No. 706,725

Int. Cl.² H01R *13/60*

U.S. Cl. 339—122 R **8 Claims**

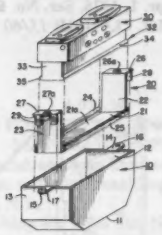
1. An improved mounting for electrical fixtures to be wired

into junction boxes having side walls joining at their inner ends a bottom wall, comprising:

a. a fixture holder bracket having a bottom portion and having leg portions joining at their inner ends said bottom portion and mutually spaced apart by a separation such that when the bracket is inserted into a box, said leg portions will lie adjacent to opposed side walls of the box when the bottom portion lies parallel to the bottom wall of the box;

b. means for attaching the outer ends of the leg portions to the box near the outer ends of its side walls;

c. the bottom portion of the holder bracket having two spaced parallel free edges extending longitudinally between said leg portions, each of these free edges being turned along the full length of the bracket to extend outwardly from the bottom portion then convergently toward each other and then divergently from each other to form between the edges a fixture receiving clip; and



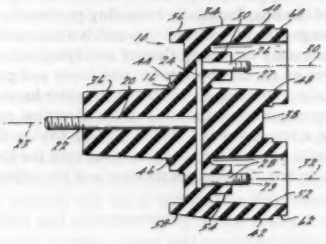
d. an electrical fixture having an outer portion comprising an electrical unit to be wired, and having an inner mounting portion receivable into the bottom portion of the bracket at any longitudinal location along said bottom portion between its legs and its clip edges, the inner mounting portion of the fixture having longitudinal ridges extending in mutually opposite directions therefrom and located to snap into and precisely fit said clip edges when the electrical fixture is against said bottom portion.

4,059,329

DOUBLE BUSHING WELL WITH CANTILEVER LOAD SUPPORTING LEGS

Herbert J. Macemon, Versailles, Ky., assignor to Kuhlman Corporation, Troy, Mich.

Filed Jan. 13, 1976, Ser. No. 648,635
Int. Cl.[2] H01R *13/50*
U.S. Cl. 339—60 R **6 Claims**



1. For a transformer having an enclosure, a bushing well comprising:

conductor means having a first portion extending into said transformer enclosure, second and third portions extending away from said transformer enclosure, said first, second and third conductor portions being substantially parallel and spaced apart, and a portion interconnecting said first, second and third conductor portions;

insulating means surrounding and supporting said conductor means;

a first leg disposed adjacent to and laterally outboard from said second conductor portion and extending toward said transformer enclosure;

a second leg disposed adjacent to and laterally outboard said third conductor portion and extending toward said transformer enclosure;

an annular shoulder surrounding said first conductor portion; and

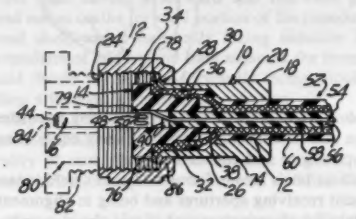
said first and second legs extending beyond a plane defined by said shoulder.

4,059,330

SOLDERLESS PRONG CONNECTOR FOR COAXIAL CABLE

James W. Shirey, Lakeland, Mich., assignor to John Schroder, Howell, Mich., a part interest

Filed Aug. 9, 1976, Ser. No. 712,955
Int. Cl.[2] H01R *17/04*
U.S. Cl. 339—177 R **8 Claims**



1. A connector for mounting on the end of a coaxial shielded cable of the type having an inner conductor surrounded by an inner dialectric sleeve in turn surrounded by a tubular braided conductor in turn syrrounded by an outer dielectric sleeve, said connector comprising:

an electrically conductive tubular body member having a first longitudinal bore accepting the coaxial cable, a second longitudinal bore of enlarged diameter and an end portion at the end of said second bore provided with an enlarged outer diameter and inner diameter portion;

a dielectric tubular plug having a longitudinal bore accepting the inner dielectric sleeve of said cable, said tubular plug being inserted in said second bore of said tubular body member with the tubular braided conductor and the outer dielectric sleeve of said cable compressibly secured between the peripheral surface of said plug and the inner surface of said second bore with an exposed end portion of said tubular braided conductor engaged with said inner surface of said second bore, said dielectric tubular plug having an enlarged outer diameter end portion disposed in the enlarged inner diameter portion of the end portion of said tubular body member and compressibly securing the exposed end portion of said tubular braided conductor between the enlarged outer diameter end portion of said tubular plug and the enlarged inner diameter portion at the end of said tubular body member;

an electrically conductive prong member partially inserted in the longitudinal bore of said dielectric tubular plug, an exposed end portion of said inner conductor being secured between a cylindrical portion of the peripheral surface of said prong and the inner surface of said bore in said tubular plug; and

an electrically conductive collar member having a rearwardly disposed inwardly extending shoulder portion for engagement with the enlarged outer diameter portion of said tubular body member, said collar member having an

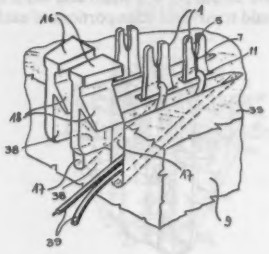
internal thread for engagement with the external thread of a receptacle for said prong member.

4,059,331

TERMINAL BLOCK

William S. Sedlacek, Chicago, Ill., and Louis Reffay, Igny, France, assignors to Reliable Electric Company, Franklin Park, Ill.

Filed Feb. 20, 1976, Ser. No. 659,796
Int. Cl.² H01R 9/06
U.S. Cl. 339—198 R 7 Claims



1. A terminal block comprising a body of dielectric material having top and lower faces and a row of openings in at least one of said faces for receiving electrically conductive terminals to position a series of said terminals in spaced relation to each other, said block having a recess adjacent to said row of openings and running generally parallel thereto, said recess being exposed to said top face at each of said openings, a fanning strip adjacent to said top face and an end of said recess and running substantially at right angles to said row, said fanning strip having a series of slots at least one of which is presented to said recess, said recess having a depth, at least adjacent to said fanning strip, sufficient to accommodate a multiplicity of wires connected to the terminals and extending through said one slot in the fanning strip, and a retaining finger forming part of said fanning strip and extending substantially across said one slot to retain said wires therein, said finger being resilient and angling toward said lower face so as to allow wires in said one slot to snap past the free end of said finger when the wires are moved toward said lower face, the angularity of said finger providing a substantial region in said one slot above said free end for accommodation of said wires.

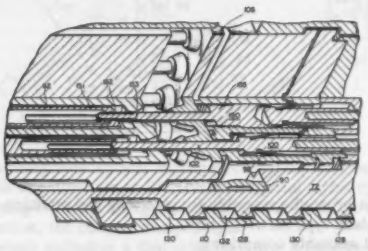
4,059,332

SNAP ACTION BREECH LOCK CONNECTOR

John J. Phillips, Rolling Hills, and Roger Stephenson, Woodland Hills, both of Calif., assignors to G & H Technology, Inc., Santa Monica, Calif.

Continuation of Ser. No. 684,923, May 10, 1976, abandoned, which is a continuation of Ser. No. 487,000, July 10, 1974, abandoned. This application Feb. 17, 1977, Ser. No. 769,583
Int. Cl.² H01R 13/54
U.S. Cl. 339—113 R 3 Claims

1. An electrical connector including the combination of
a plug section,
a first set of electrical contacts on said plug section,
a receptacle section adapted to mate with said plug section,
a second set of electrical contacts on said receptacle section,
the contacts in each set of electrical contacts being adapted to electrically engage a corresponding contact in the other set to provide mated pairs of contacts,
means for urging said sections into full electrical and locked engagement comprising
spring means operable to advance one of said sets of contacts into full electrical contact with the other set of contacts,
said spring means biasing said section carrying said one set of said contacts into full locked engagement with the other sections,
and monitor means for indicating the position of said plug and receptacle sections in such full electrical and mechanically locked engagement,
said monitor means comprising
one of said mated pairs of contacts serving as monitoring contacts and having non-electrically conductive contacting surfaces mechanically engagable when said remaining



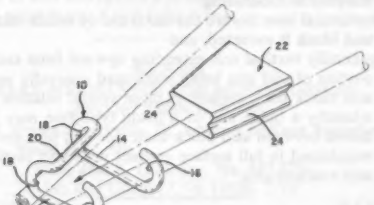
sets of contacts are initially mated and electrically conductive surfaces electrically engageable only upon said sections being positioned in full mechanically locked engagement by said spring means with all of the sets of contacts on one of said sections being fully locked into contacting engagement with all of the sets of contacts on the other of said sections, said monitor means indicating such full electrical and mechanically locked engagement only when all of said sets of contacts are in full mated contacting engagement.

4,059,333

ELECTRICAL CONNECTOR

James Lenhart Mixon, Jr., Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Jan. 5, 1977, Ser. No. 756,949
Int. Cl.² H01R 7/06
U.S. Cl. 339—247 1 Claim

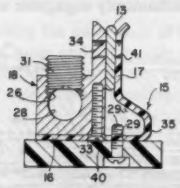


1. An electrical connector for mechanically retaining and electrically connecting two cables, comprising:
a. a wedge member of conductive material having beveled sides converging toward one end; and
b. a member formed from a length of resilient spring wire having two spaced apart, parallel sections one shorter than the other, said sections being joined together by a length of said wire, the ends of each section being formed into inwardly facing hooks,
whereby upon cradling cables in parallel hooks and driving the wedge member inbetween, said cables are mechanically retained and electrically connected.

4,059,334
BLADE TYPE FUSE CLIP ASSEMBLY

William R. Bailey, Melrose Park, Ill., assignor to Eltra Corporation, New York, N.Y.

Filed June 17, 1976, Ser. No. 696,875
Int. Cl.[2] H01R 11/22; H01H 85/20, 85/24
U.S. Cl. 339—258 F 3 Claims



1. In a fuse clip assembly for receiving and retaining one end of a blade type cartridge fuse,

said assembly comprising;

a terminal connector block made of electrically conductive material and formed from an extrusion, said terminal connector block being a generally L-shape polyhedron having

a substantially flat base,

a pair of L-shape side surfaces extending upward from opposing edges of said base,

an elongate back surface extending upward from said base and in communication with said L-shape sides, said back surface being flat for providing an efficient electrically conductive surface contact between said block and the blade of a fuse positioned in said clip;

the front of said block including upper and lower substantially vertical surfaces connected by a substantially horizontal surface therebetween, and a top surface of said block being acutely angled with said back surface and extending upwardly therefrom toward the top of said upper front surface;

a hole extending through said block from a bottom portion of one L-shape side thereof to a bottom portion of the other, fastener means positioned in communication with said hole for retaining an electrical conductor positioned in said hole;

a resilient generally L-shape member made of a dielectric material and including

a horizontal base toward the distal end of which said base of said block is mounted, and

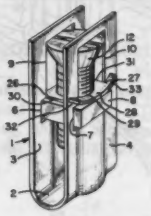
a generally vertical arm extending upward from said base, a portion of said arm being positioned generally parallel to said block back surface in close spatial relation thereto, whereby a blade end of a blade type fuse may be positioned between said block back side and said arm and be maintained in full surface contact with said back side by said resilient arm.

4,059,335
ELECTRIC CONNECTOR

Hans Simon, Bruchhausener Strasse, 5463 Unkel (Rhine), Germany

Filed Feb. 25, 1976, Ser. No. 661,274
Claims priority, application Germany, Mar. 3, 1975, 2509158
Int. Cl.[2] H01R 7/08
U.S. Cl. 339—272 UC 7 Claims

1. Electric connector comprising a U-shaped main portion having parallel legs and a transverse base extending therebetween, said legs respectively being formed with aligned intermediate cutout portions, a nut extending between said legs and into said intermediate cutout portions thereof, and a screw threaded through said nut and situated between said legs while having a head situated at a greater distance from said base than said nut and an opposed free end situated nearer to said base than said nut and adapted to engage a conductor extending along said base between said legs, each of said intermediate cutout portions being defined in part by opposed transverse edge portions of each leg which extend transversely with respect to the axis of said screw and which are situated from each other by a distance substantially greater than the thickness of said nut, and a leaf spring extending together with said nut between said legs and into said intermediate cutout portions thereof, said leaf spring being formed with a substantially central hole through which said screw extends and engaging said nut at the region of said hole while being curved away from said nut toward one of said transverse edge portions of each intermediate cutout portion when said nut is in the region of the other of said transverse edge portions of each intermediate cutout portion, so that when said screw is turned at said free end thereof with respect to said nut into engagement with a conductor said nut will move along said screw away from said other toward said one transverse edge portion of each intermediate cutout portion to compress said leaf spring between said one transverse edge portion of each intermediate cutout portion and said nut for limiting pressure of the screw with respect to the conductor while preventing loosening of the screw by vibrations, said leaf spring extending outwardly beyond said legs and having outside of the space between said legs integral tongues projecting beyond said intermediate cutout portions so that said legs are situated between said tongues to be reinforced thereby for preventing outward buckling of said legs.



4,059,336
MICROSCOPE AND MAGNIFICATION CHANGER

Harold Horace Hopkins, 26 Cintra Ave., Reading, Berkshire, England

Filed Feb. 14, 1975, Ser. No. 549,981
Claims priority, application United Kingdom, Feb. 14, 1974, 6762/74
Int. Cl.[2] G02B 21/20, 17/08
U.S. Cl. 350—55 9 Claims

1. A stereo microscope for stereoscopically studying an object, comprising:

two separate light paths for two separate beams of light from the object; each said light path being defined by:

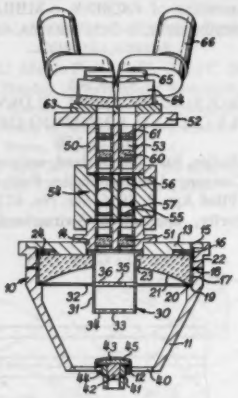
a respective first reflective surface positioned and directed so as to intercept a respective one of the two separate beams of light;

second reflecting surface means spaced from said first reflective surfaces; said second reflecting surface means being shaped and oriented to have the separated beams of light reflected to different locations on said second reflecting surface means by said first reflecting surfaces; said second reflected surface means also being shaped and oriented such that the two beams of light reflecting therefrom are disposed along substantially parallel axis;

a respective magnification means and eyepiece in each said light path and positioned to intercept and receive a respective beam of light reflected from said second reflecting surface means; and

a portion of each light path including, in series, a means for converging light leaving said second reflective surface

means, and a magnification changer positioned to receive light converged by said converging means, said magnification changer comprising a converging lens, a diverging lens spaced along the optical axis thereof, means for rotating said lenses about a fixed point so that a converging light beam is initially incident upon either of said lenses or passes directly through the changer without impinging upon said lenses, thereby permitting a change of magnification to be effected between the three positions.

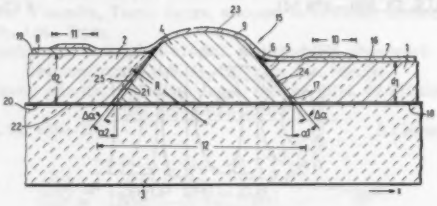


4,059,337

OPTICAL COUPLING DEVICES

Gerhard Winzer, and Walter Rauscher, both of Munich, Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Apr. 6, 1976, Ser. No. 674,066
Claims priority, application Germany, Apr. 17, 1975, 2517072
Int. Cl.² G02B 5/14
U.S. Cl. 350—96 C **12 Claims**



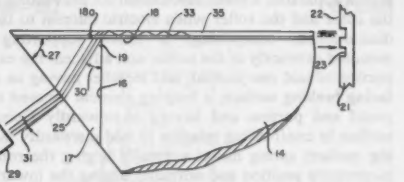
1. An optical coupling device for coupling of integrated optical components which are arranged on separate component substrates that may have different thicknesses, said coupling device comprising a base substrate, at least two component substrates disposed on the base substrate and arranged closely adjacent to each other, each of said component substrates having an integrated optical component disposed thereon, an intermediate substrate disposed between the two component substrates and in engagement therewith, and at least one waveguide disposed on a surface of the intermediate substrate and coupled to the optical components on the respective component substrates.

4,059,338

INTEGRATED OPTICAL WAVEGUIDE COUPLER

Clifford C. Hartelius, Jr., Sunnyvale, Calif., assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Sept. 9, 1975, Ser. No. 611,649
Int. Cl.² G11B 7/12; G02B 5/14
U.S. Cl. 350—96 C **9 Claims**



1. An integrated optical waveguide coupler for coupling energy in one direction to illuminate an optical stylus tip and for carrying reflected energy received by said tip in the opposite direction, the coupler comprising,

a substrate including a first relatively low refractive index material portion having a face and a tip opposite said face and a second relatively high refractive index material portion formed on said face, said substrate having a planar top surface at an angle with respect to said face and defining a light corner within said second material portion at said surface, said second substrate further having a light receiving surface defined by a plane intersecting said face and said planar top surface at a predetermined angle with respect to said top surface,

a layer of relatively low refractive index material formed on said planar top surface having a thickness ranging from $\frac{1}{4}$ to $\frac{1}{2}$ of the equivalent vacuum wavelength at the coupler operating wavelength,

and an optical waveguide formed along the upper surface of said layer extending to said tip and overlapping and extending beyond said light corner,

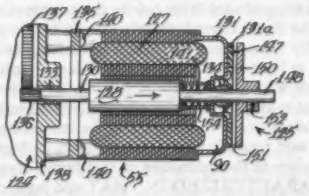
so that when light energy of a predetermined operating wavelength is incident said light receiving surface at a predetermined entrance angle with respect to said top surface it illuminates a portion of said planar top surface adjacent said corner and is coupled to said waveguide and travels to said tip to illuminate an associated surface and light energy reflected from said associated surface is coupled to said waveguide and travels along said waveguide to a point beyond said light corner.

4,059,339

BRAKE MECHANISM FOR MOTOR DRIVEN PROJECTION SCREEN

Donald J. Brown, Naperville, Ill., assignor to Knox Manufacturing Co., Wood Dale, Ill.

Filed Jan. 8, 1976, Ser. No. 647,578
Int. Cl.² G03B 21/56; H02K 7/10
U.S. Cl. 350—117 **8 Claims**



1. In an electric motor unit for rotatably driving the roller of a projection screen apparatus, the motor unit including a stator for establishing a magnetic field when electrically actuated,

and a rotor rotatably mounted within the stator and provided with limited axial movement from an inoperative position to an operative position in alignment with the magnetic field, said rotor having aligned journals at its opposite ends with one of said journals having an exposed end portion projecting outwardly of the motor unit and the other of said journals being operatively connected to rotate the roller of the projection screen apparatus, a brake mechanism for preventing rotation of the rotor and the roller when electric current to the stator is discontinued, comprising: a brake supporting member mounted exteriorly of the motor unit adjacent the exposed end portion of said one journal, said member having an outwardly facing braking surface; a braking element secured to said exposed end portion and having an inwardly facing braking surface in confronting relation to said outwardly facing braking surface; spring means normally urging the rotor toward inoperative position and normally urging the inwardly facing braking surface into frictional braking engagement with the outwardly facing braking surface, electric actuation of the stator causing the rotor to be moved to its operative position in opposition to said spring means so as to move the exposed end portion of the one journal and said braking element outwardly to separate the two braking surfaces, and subsequent discontinuance of electric current to the stator permitting the rotor to be shifted to inoperative position with the surfaces in braking engagement to prevent rotation of the rotor journals and the screen roller; and means for adjustably positioning the braking element axially of the exposed end portion to vary the force exerted by the spring means.

4,059,340

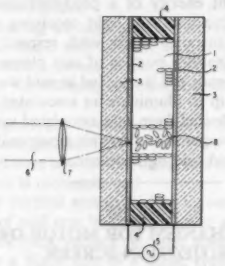
DOPED LIQUID CRYSTAL DISPLAY DEVICE

Frederic Jay Kahn, Palo Alto, Calif., and Gary Newton Taylor, Fanwood, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N. J. 07974

Filed Nov. 18, 1974, Ser. No. 524,702

Int. Cl.² G02F *1/13*

U.S. Cl. 350—160 LC **1 Claim**



1. Liquid crystal information storage and display device comprising a layer comprising a liquid crystal material which in the display mode is partly in an essentially transparent state and partly in a light scattering state, means for maintaining the temperature of said layer below the temperature of transition from the liquid crystal phase to the isotropic phase, a pair of optically transparent electrodes containing said layer and of which at least one is infrared absorbing, an infrared laser incident on said infrared absorbing electrode from a direction external to said layer for locally heating said infrared absorbing electrode, thereby locally raising the temperature of said layer above said transition temperature, so as to locally change the orientation of the molecules of said liquid crystal material,

CHARACTERIZED IN THAT said layer contains nonliquidcrystalline dopants which are more soluble in the isotropic phase than in the liquid crystal phase in the concentration range of from 0.1 percent to 5 percent by weight whereby the optical contrast ratio between said essentially transparent state and said light scattering state is improved, and further CHARACTERIZED IN THAT either (1) said liquid crystal material is a mixture of MBBA and CN and said dopant is o-MBBA, or (2) said liquid crystal material consists essentially of a mixture of CBOA, CBDA, and CBPDA and said dopant is selected from the group consisting of o-CBDA, o-MBBA, p-butylaniline, o-nitrononylbenzene, n-decylbenzene, and adamantane.

4,059,341

ELECTROCHROMIC DISPLAY DEVICE WITH ELECTROLYTES AND A METHOD OF PRODUCING THE SAME

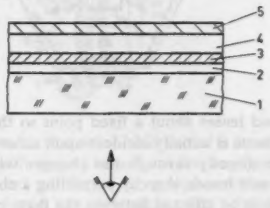
Hans-Rudolf Zeller, Birr, Switzerland, assignor to BBC Brown, Boveri & Company, Limited, Baden, Switzerland

Filed Apr. 2, 1976, Ser. No. 673,160

Claims priority, application Switzerland, May 7, 1975, 5866/72

Int. Cl.² G02F *1/16*

U.S. Cl. 350—160 R **9 Claims**



1. In an electrochromic display device having an electrochromic layer present in its solid form upon a first electrode and in contact with a water-free electrolyte contacting a second electrode, the the improvement comprising:

a proton-free substance as said electrolyte and an operating voltage between said two electrodes exceeding two volts.

4,059,342

MICROSCOPE OBJECTIVE WITH CORRECTING MEANS

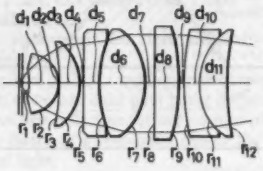
Tsutomu Tojyo, Hachiouji, Japan, assignor to Olympus Optical Co., Ltd., Japan

Filed Jan. 23, 1976, Ser. No. 651,781

Claims priority, application Japan, Jan. 28, 1975, 50-11636; Jan. 28, 1975, 50-11637

Int. Cl.² G02B *21/02*

U.S. Cl. 350—175 ML **6 Claims**



1. A microscope objective with correcting means comprising a front lens group arranged on the object side of a predetermined airspace and a rear lens group arranged on the image side of said airspace, said microscope objective with correcting means being arranged to vary said pre-determined airspace by moving said rear lens group in respect to said front lens group in order to correct aberrations to be caused when thickness of a cover glass used for observation by said microscope objective is different from the corresponding standard thickness of the cover glass and satisfying the following condition when reference symbol f_I represents the focal length of said front lens group and reference symbol f_{II} represents the focal length of said rear lens group:

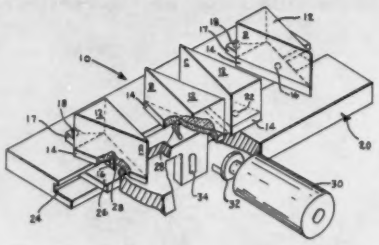
$|f_{II}/f_I| \leq 8$

4,059,343

PRISMATIC ANAMORPHIC SYSTEM FOR OPTICAL CORRELATORS

Daniel C. Kowalski, Menlo Park, Calif.; Juan C. Dawson, Littleton, Colo., and Stanley J. Krulikoski, deceased, late of Dearborn, Mich. (by Shirley Ann Krulikoski, executrix), assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Feb. 26, 1976, Ser. No. 661,462
Int. Cl.² G02B *13/10, 5/18*
U.S. Cl. 350—182 11 Claims



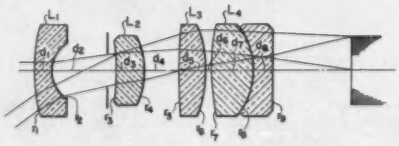
1. A prismatic anamorphic system comprising a base plate having a surface thereon, said base plate having a longitudinal channel therein, a plurality of prisms, said plurality of prisms being arranged along the longitudinal axis of said base plate with adjacent pairs of prisms having their respective bases located on opposite sides of said longitudinal channel, each of said prisms being pivotally connected to said base plate about an axis, the pivotal axis of each of said prisms being perpendicular to said surface of said base plate, means located within said channel for rotating said prisms about said pivotal connections and means operatively connected to said means for rotating said prisms for providing operative power thereto.

4,059,344

RETROFOCUS-TYPE OBJECTIVE FOR ENDOSCOPES

Nobuo Yamasita, Tama, Japan, assignor to Olympus Optical Co., Ltd., Japan

Continuation of Ser. No. 624,823, Oct. 22, 1975, abandoned.
This application Feb. 14, 1977, Ser. No. 768,595
Claims priority, application Japan, Oct. 26, 1974, 49-123033
Int. Cl.² G02B *13/04*
U.S. Cl. 350—220 5 Claims



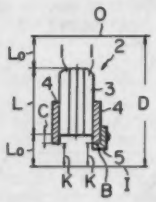
1. A retrofocus-type objective for endoscopes comprising a front diverging lens group and a rear converging lens group consisting of a first lens group and a second lens group, said retrofocus-type objective for endoscopes being arranged to be focused by varying the airspace between said first and second lens groups while fixing said front diverging lens group at a constant position.

4,059,345

FIXTURE FOR MOUNTING BAR LENS ARRAY IN ELECTROPHOTOGRAPHIC APPARATUS

Atsushi Kawamura, and Motoaki Kawazu, both of Tokyo, Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan

Filed Oct. 14, 1975, Ser. No. 621,881
Claims priority, application Japan, Oct. 17, 1974, 49-119692
Int. Cl.² G02B *7/02*
U.S. Cl. 350—252 2 Claims



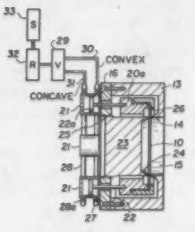
1. A fixture for mounting a bar lens in such a manner that ends of the bar lens are equally spaced from two respective planes, comprising first alignment means having a sleeve fixed to the bar lens and second alignment means having a stopper fixedly disposed between the two planes, the first and second alignment means being arranged so that when the sleeve and the stopper are aligned with each other, the ends of the bar lens are equally spaced from the two respective planes.

4,059,346

CONTROLLED FOCUS MIRROR WITH RIM CONTROLLED FLEXURE

Howard S. Levine, San Jose, Calif., and Robert Winter, Dix Hills, N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed June 30, 1976, Ser. No. 701,196
Int. Cl.² G02B *5/10*
U.S. Cl. 350—295 4 Claims



1. In a variable focus mirror, a frame, a first internally extending annulus on said frame,

a second internally extending annulus on said frame opposite said first annulus,

a uniform, unstressed elastic disk, said disk having a diameter greater than the diameter of said annuli,

a reflective surface on said disk,

said disk being interposed said annuli,

disk holding means encircling the rim of said disk for holding said disk in concentric relationship with and adjacent said annuli,

means for adjusting the position of said disk holding means axially relative to said annuli and thereby applying a force at the periphery of said disk in a direction urging said disk against said first or second annulus,

whereby said disk is flexed and said reflective surface assumes a substantially spherical concave configuration when said disk is urged against said first annulus, and said

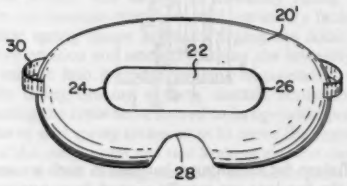
disk is flexed and said reflective surface assumes a substantially spherical convex configuration when said disk is urged against said second annulus whence the focal length of said mirror is varied in accordance with the degree of flexure of said disk.

4,059,347

OPTICAL INSTRUMENT AND VIEWING METHOD

Richard P. Eitel, 2711 Taylor Drive, Everett, Wash. 98203

Filed May 24, 1976, Ser. No. 689,182
Int. Cl.[2] G02B *5/00*
U.S. Cl. 350—319 **12 Claims**



1. An optical device for aiding an individual wearing the device to concentrate his vision on an object, said device comprising:

a head mount having a horizontal see-through zone with outwardly curved, clearly defined ends spaced apart horizontally about three inches to approximate the pupillary distance of the viewer and extending over a vertical distance sufficient for vertical proximity expansion, said zone having a vertical width through most of its horizontal length as great as at said outwardly curved ends, and

means for positioning said head mount with said zone centered in front of the viewer's eyes at a distance therefrom such that said outwardly curved ends horizontally approach each other by second degree fusion and vertically elongate by vertical proximity expansion whereby said ends are seen as a generally circular image when the viewer looks through said zone.

4,059,348

OBJECTIVE PLOTTING OF VISUAL FIELDS BY EYE MOVEMENT MONITORING

Marvin E. Jernigan, Weston, Mass., assignor to Narco Scientific Industries, Inc., Fort Washington, Pa.

Division of Ser. No. 505,339, Sept. 12, 1974, Pat. No. 3,984,156.
This application July 21, 1976, Ser. No. 707,373
Int. Cl.[2] A61B *3/02*
U.S. Cl. 351—30 **11 Claims**

1. An apparatus for presenting a target image at various selected locations within a subject's visual field comprising:

a light source adapted to emit a beam of light;

a mirror:

means mounting said mirror with respect to said light source to reflect said beam, said means mounting said mirror being constructed and arranged to enable said mirror to be oriented in various selected attitudes with respect to said beam of light to selectively reflect said beam of light to said various locations;

electrically operable drive means connected to said means for mounting said mirror to effect said movement thereof;

circuit means having its output connected to said drive means for operating said drive means;

said circuit means including storage register means for storing digital information corresponding to a selected intended position of said drive means:

feedback means operatively associated with said drive means for developing a signal corresponding to the position of said drive means;

said circuit means including a comparator having inputs from each of said storage register means and said feedback means;

said circuit means including means responsive to the output of said comparator to operate said drive means when said input to said comparator are unequal thereby to move said mirror toward a selected attitude and for thereafter terminating operation of said drive means when said inputs to said comparator are equal.

7. An apparatus for presenting a target image to a subject and for recording the position of said target image comprising:

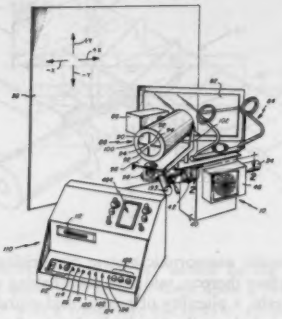
a housing having front and rear walls;

projection shutter means mounted to said front wall;

camera shutter means mounted to said rear wall.

a double faced mirror mounted within said housing between said projection shutter means and said camera shutter means;

projection light means supported within the housing and located with respect to said mirror to direct a first narrow



beam of light along an axis toward one surface of said mirror and to reflect said first beam toward said projection shutter;

recording light means supported in said housing on the other side thereof for directing a second narrow beam of light along said axis and toward the opposite surface of said mirror to enable said second beam to be reflected toward said camera shutter means and in a direction which is opposite to that at which said light beam is reflected from said one surface of said mirror;

film mounting means disposed on said rear wall and on the other side of said camera shutter means;

means for orienting said mirror in selected attitudes thereby to vary the direction of each of said reflected first and second beams;

means for operating said projection light means and said recording light means independently of each other; and

means for operating each of said projection shutter means and camera shutter means.

4,059,349

PHOTOGRAPHING SYSTEM AND A MOTION PICTURE CAMERA USING THE SAME

Yoshio Komine, Tokyo, and Noritsugu Hirata, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 7, 1975, Ser. No. 575,171
Claims priority, application Japan, May 10, 1974, 49-51988
Int. Cl.[2] G03B *23/02*
U.S. Cl. 352—72 **22 Claims**

1. A motion picture camera capable of having a strip of silent film being able to record picture image information only and a strip of sound film being able to record picture image information and sound information selectively loaded thereinto, comprising:

a first transport means which contributes to the transporting

of said film to a picture formable position of a picture image forming means;

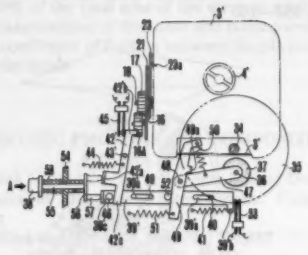
a sound recording head capable of recording sound information on a sound film when said film is loaded;

a second transport means having a capstan rotatable about a fixed axis and a movable pressure roller capable of shifting between a position to engage with said capstan and a position to disengage therefrom, said transport means being so positioned as sandwiching a running path of said sound film which passes through a position adjacent to said sound recording head, and capable of running the sound film on the running path which passes through near the sound recording head by pressing the pressure roller against the capstan; and

a control means to control said film transport means by the first transport means and the second transport means, said control means comprises:

a. a release means which can be handled from outside of the camera and can be shifted to (1) a first position to activate the camera and to (2) a second position to stop the operation of the camera,

b. a first actuating means to control the actuation of the first transport means and the stopping thereof, said first actuating means being able to be shifted to (1) a first position at which said actuating member is placed as the release means is positioned at its first position to put the first transport means in an operative state and to (2) a



second position at which said actuating member is placed as the release member is positioned at its second position to put the first transport means in an inoperative state, in association with the shifting of the release means,

c. a second actuating means to control the shifting of the pressure roller, wherein said actuating means can be selectively shifted to a first position at which the pressure roller engages with the capstan and to a second position at which it disengages from the same, and

d. a mode change-over means to selectively establish the associating relationship between the release means and the second actuating means so that the second actuating means is shifted to its first position when the release member is placed at its first position, while the second actuating means is shifted to its second position when the release means is placed at its second position, wherein said changeover means can be shifted to a first position at which it is located between the release means and the second actuating means wherein the associated relationship is formed and to a second position at which it is placed outside of the space between the release means and the second actuating means wherein said associated relationship is released;

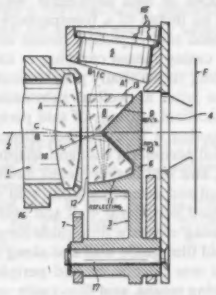
whereby, at the time when the silent film is loaded, the mode change-over means is placed at its first position, while said mode change-over means is placed at its second position when the sound film is used.

4,059,350

REFLEX SYSTEM FOR CINEMATOGRAPHIC CAMERA

Josef Schild, Vienna, Austria, assignor to Karl Vockenhuber and Raimund Hauser, both of Vienna, Austria

Filed Aug. 10, 1976, Ser. No. 713,223
Claims priority, application Austria, Aug. 11, 1975, 6232/75
Int. Cl.² G03B 7/08
U.S. Cl. 352—141 **7 Claims**



1. In a cinematographic camera comprising an objective in line with a light gate for illuminating an intermittently advancing film, a shutter periodically interposable between said objective and said light gate during intervals of advance of said film, and photosensitive means for generating a signal indicative of the amount of incident light traversing said objective, said shutter being provided with light-guiding means for directing light rays from said objective onto said photosensitive means during said intervals,

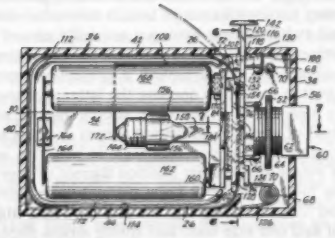
the improvements wherein said light-guiding means comprises a body of transparent material substantially overlying said light gate during said intervals, said body having a front surface proximal to said objective giving passage to incident light rays, an internally reflecting rear surface proximal to said light gate with two forwardly converging rear faces, a first lateral surface adjoining one of said rear faces for letting light rays reflected by said one of said rear faces pass directly to said photosensitive means, and an internally reflecting second lateral surface opposite said first lateral surface directing light rays reflected by the other of said rear faces toward said first lateral surface for passage to said photosensitive means.

4,059,351

HAND-HELD FILM PROJECTORS

Harry A. Wisotsky, 1284 Ocean Parkway, Brooklyn, N.Y. 11230

Filed Oct. 15, 1976, Ser. No. 732,721
Int. Cl.² G03B 21/00
U.S. Cl. 353—43 **5 Claims**



1. In a hand-held projector for projecting onto a given surface a series of images derived from a series of transparencies carried by a film strip, comprising hollow casing means having

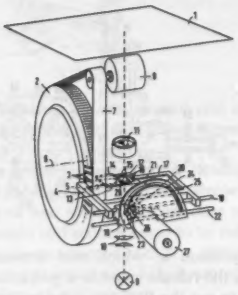
a pair of opposed side walls and an endless peripheral wall extending between and interconnecting said side walls and defining therewith a hollow interior of said casing means, said peripheral wall having opposed front and rear portions and opposed longitudinal portions extending between interconnecting said front and rear portions, said front portion of said peripheral wall having opposed ends and carrying substantially midway between said opposed ends an objective means having an optical axis extending substantially midway between said longitudinal portions of said peripheral wall for projecting onto said surface an image of a transparency situated in said casing means behind said objective means along said optical axis thereof, said casing means carrying in its interior a film-guide wall extending substantially perpendicularly to said side walls between the latter as well as substantially perpendicularly to said longitudinal portions of said peripheral wall, said film-guide wall having a front surface directed toward said front portion of said peripheral wall and adapted to engage and guide a film strip, and said casing means having to the rear of said film-guide wall and extending along said opposed longitudinal portions of said peripheral wall and said rear wall in the interior of said casing means a film-guide means for guiding a film strip along said film-guide wall and along said longitudinal wall portions and rear portion of said peripheral wall in the interior of said casing means, said film-guide wall being formed with an opening through which said optical axis extends, and said casing means carrying in its interior behind said film-guide wall a light source situated along said optical axis in alignment with said opening of said film-guide wall and on opposite sides of said light source a pair of batteries each extending between said film guide wall and said rear portion of said peripheral wall, one of said longitudinal wall portions of said peripheral wall being formed with a slot through which film is introduced to move along said film-guide wall and along said film guide means, one of said longitudinal portions of said peripheral wall being formed with an opening, and a manually operable film-advancing means extending through the latter opening into the interior of said casing means and being accessible at the exterior or said casing means at the region of the latter opening, said film-advancing means being situated between said film-guide wall and said objective means and cooperating with said film-guide wall for guiding the film strip, spring means situated in said casing means for urging said film-advancing means to an outer position, one of said side walls being formed with an opening and said film-advancing means having a springy pawl portion engaging an edge of the latter opening of said one side wall for maintaining said film-advancing means in an inner rest position in opposition to the force of said spring means, said film-advancing means having a film-advancing tooth for extending into a perforation of the film strip for advancing the latter during manual movement of said film-advancing means from said outer to said inner position thereof, said film-guiding wall carrying a tooth engating a perforation of the film strip to prevent the latter from moving with said film-advancing means when the latter is urged to its outer position by said spring means, and conductor means carried by said casing means in the interior thereof and electrically connected with the batteries and the light-source means for electrically connecting the batteries and light-source means into a circuit, said conductor means having portions forming a switch means for closing said circuit, said switch means having a normally closed position for energizing the light source means from the batteries, and said film-advancing means having a projection cooperating with said switch means for opening the latter and opening the circuit for deenergizing the light source means when the springy pawl of said film-advancing means engages said edge of said opening of said one side wall to maintain said film-advancing means at said inner position thereof in opposition to said spring means, whereby upon manual movement of said pawl of said film-advancing means away from said edge of said opening of said one side wall, said spring means displaces said film-advancing means to said outer position thereof whereupon said switch means closes to energize said light-source means for providing light traveling along the optical axis through said opening in said film guide means, said film-advancing means also being formed with an opening, and the latter opening being aligned with said opening of said film-guide means and situated along said optical axis only when said film-advancing means is in said outer position thereof, so that release of said film-advancing means to be moved by said spring means to said outer position thereof will result in projection of an image from a transparency aligned with the aligned openings of said film-guide means and said film-advancing means, while manual movement of said film-advancing means back to said inner position thereof will advance the next transparency into a position to be projected while a wall portion of said film-advancing means will cover said opening of said film-guide means to prevent the next transparency from having its image projected until the film-advancing means is returned by the spring means to said outer position thereof.

4,059,352

SLIDE PROJECTOR

Ulrich Bär, Nurnberg, and Martin Schmidt, Erlangen, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed May 5, 1976, Ser. No. 683,511
Claims priority, application Germany, Sept. 5, 1975, 2539597
Int. Cl.[2] G03B *23/06*
U.S. Cl. 353—103 **7 Claims**



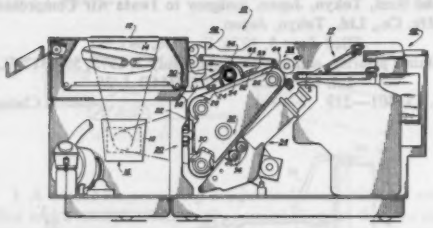
1. A slide projector comprising an optical projection system, a slide magazine being mounted for displacement, a drive motor coupled to said magazine for displacing the magazine, mechanical stop means for positioning a slide in a projection position in the projection system, guide means for guiding a slide as it is moved to the projection position, and pusher means for moving a slide from the magazine along the guide means to the projection position and for returning the slide back to said magazine, said pusher means including a pusher member being mounted for back and forth movement along a linear path, said member having two tongues extending toward one another and spaced apart to enable the magazine to move therebetween, one of the two tongues being for ejecting a slide from the magazine and the other of the two tongues being for pushing a slide back into the magazine, an electromotor, a disk having a curved slot coupled to said electromotor to move therewith, a roller being engaged in said slot, and means mounting the roller for movement in a linear path and including a spring for transferring linear displacement of the roller to the pusher member, said curved slot having a shape so that as the other tongue pushes the slide back into the magazine, it is inserted into said magazine and is then withdrawn from the magazine to a final position which enables the magazine to be freely displaced between the two spaced tongues.

4,059,353

PHOTORECEPTOR BELT SYSTEM

Louis W. W. Shaffer, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 28, 1976, Ser. No. 680,811
Int. Cl.[2] G03G 15/00
U.S. Cl. 355—16 2 Claims



1. An improved photoreceptor belt system having an endless flexible photoreceptor belt, means for mounting the belt for movement around a closed path which includes a flat run, means defining a planar surface along the run, and means for drawing the belt toward the surface as the belt moves around the closed path, wherein the improvement comprises:

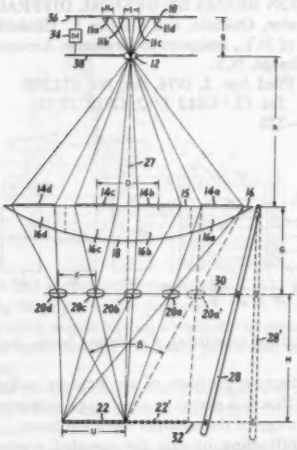
a mesh extending across the surface for preventing the belt from contacting the surface as the belt moves around the closed path, the open area of the mesh being approximately 40% of the total area of the mesh to minimize the rate of contamination of the mesh and consequently minimize the coefficient of friction between the photoreceptor belt and the mesh.

4,059,354

STEREOSCOPIC PHOTOGRAPH COMPOSITION APPARATUS

Allen Kwok Wah Lo, and Jerry Curtis Nims, both of Dunwoody, Ga., assignors to Dimensional Development Corporation, Atlanta, Ga.

Filed Oct. 12, 1976, Ser. No. 731,517
Int. Cl.[2] G03B 27/32, 35/14
U.S. Cl. 355—22 8 Claims



1. Apparatus for composing a stereoscopic photograph from a plurality N of adjacent two-dimensional views of an object field taken from spaced vantage points relative to the field, comprising:

means for enlarging said adjacent N two-dimensional views to form a corresponding plurality N of adjacent enlarged two-dimensional images of said views; and

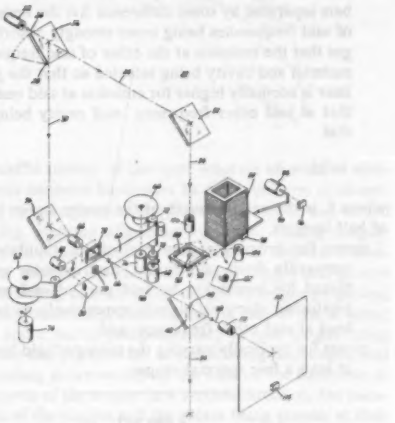
means, including a corresponding plurality N of projecting lenses, for projecting said N enlarged two-dimensional images through a lenticular screen of lenticule width w and on to a photosensitive surface positioned therebehind, with the projected image from each enlarged image of a selected object in the object field in substantial registry with a reference point, so as to form behind each lenticule of said screen a corresponding plurality N of condensed images which are spaced apart by substantially w/N.

4,059,355

MICRO-COMPOSING REDUCTION PRINTER

Robert E. Fritsch, Fort Wayne, Ind., assignor to Micro-Copy, Inc., Fort Wayne, Ind.

Filed Nov. 8, 1976, Ser. No. 739,601
Int. Cl.[2] G03B 27/52, 27/70
U.S. Cl. 355—43 21 Claims



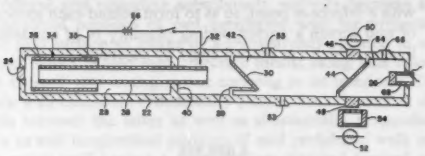
1. Apparatus for reformatting previously photographed data comprising: a source of light; means for directing light from said source in at least one of first and second substantially mutually perpendicular axes which intersect at a predetermined point; means for advancing developed photographic film in a first plane past a first location, said first axis passing through said first location and being substantially perpendicular to said first plane, said first location being spaced from said point on one side thereof; means for positioning a developed photographic slide at a second location in a second plane substantially perpendicular to said first plane, said second axis passing through said second location and being substantially perpendicular to said second plane, said second location being spaced from said point on one side thereof; light beam splitting means at said point for passing a part of the total light in one of said first and second axes and reflecting the remaining part in the other of said first and second axes; viewing screen means on said one axis spaced from said point on the other side thereof for viewing the light image on said one axis from said beam splitting means; and means for positioning unexposed and undeveloped photographic film in a third plane at a third location, the other of said axes passing through said third location and being substantially perpendicular to said third plane, said third location being spaced from said point on the other side thereof whereby said unexposed and undeveloped film is exposed to the light image on said other axis from said beam splitting means.

4,059,356

GAS DETECTOR

Paul L. Kebabian, Sommerville, Mass., assignor to Environmental Research & Technology, Inc., Concord, Mass.

Continuation-in-part of Ser. No. 552,156, Feb. 24, 1975, abandoned. This application Aug. 13, 1976, Ser. No. 714,115
Int. Cl.[2] G01N 21/22
U.S. Cl. 356—204 20 Claims



1. A device for detecting the presence of a specific gas in an atmosphere to be tested, said device comprising, in combination:

a laser having a resonant cavity at least a portion of which contains a material in which emission can be stimulated at least at two different frequencies centered at wave numbers separated by some difference $\Delta\nu$, the emission at one of said frequencies being more strongly absorbed by said gas that the emission at the other of said frequencies, said material and cavity being selected so that the gain of said laser is normally higher for emission at said one frequency that at said other frequency, said cavity being tuned so that

$$m/2L = \Delta\nu$$

where L is the optical length of the cavity and m is a number of half integers,

means for directing at least part of the stimulated emission outwardly from said cavity, first detector means positioned for irradiation by said part of said emission for producing electrical signals responsively to emissions at least at said other frequency; and

means for cyclically varying the tuning of said laser through at least a free spectral range.

4,059,357

DENSITOMETER CALIBRATED REFERENCE STANDARD

Gerald L. Klein, Orange, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Filed Apr. 2, 1976, Ser. No. 673,026
Int. Cl.[2] G01J 1/02
U.S. Cl. 356—243 5 Claims

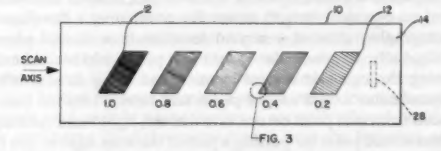


FIG. 3

1. A wavelength independent optical density standard for use in calibrating and checking an instrument which scans the standard with an illuminated zone along a predetermined scanning axis, the standard comprising:

a. an optically transparent substrate; and,

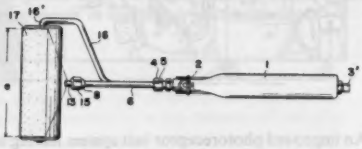
b. a light attenuating material imposed on said substrate to create a plurality of light attenuating strips in spaced relationship to form a band displaying a known optical density to light passing therethrough, said band having an area capable of totally eclipsing the illuminated zone, said light attenuating strips being disposed to produce a sweeping motion of the illuminated zone along a line normal to the scanning axis as the standard is scanned.

4,059,358

PRESSURE COATING ROLLER ASSEMBLY

Kazuo Arai, Tokyo, Japan, assignor to Iwata Air Compressor Mfg. Co., Ltd., Tokyo, Japan

Filed June 3, 1976, Ser. No. 692,581
Claims priority, application Japan, July 2, 1975, 50-93178[U]
Int. Cl.[2] B43M 11/02; B44D 3/28
U.S. Cl. 401—219 4 Claims



1. A pressure feed coating roller and spray gun assembly attachable to an external pressurized source of coating material, said assembly comprising:

a coating roller;

a spray nozzle mounted in predetermined spaced relationship to said coating roller;

said spray nozzle including a jet orifice through which a jet of coating material passes and bevelled surface means facing said jet orifice and against which said jet of coating material impinges for diverting said jet toward the surface of said coating roller in the form of a thin, substantially flat spray which diverges laterally outwardly in a direction parallel to the longitudinal axis of said coating roller; and

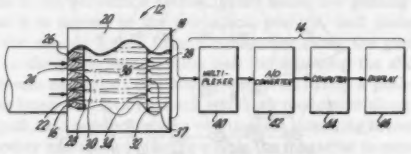
the length of said coating roller being equal to the laterally divergent width of said spray at the position of contact of said spray with said surface of said coating roller.

4,059,359

METHOD AND APPARATUS FOR QUANTIZING RADIATION BEAMS BY OPTICAL DIFFRACTION

J. Walter Foster, Oakdale, and Charles L. Dunkerley, Levittown, both of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Apr. 2, 1976, Ser. No. 672,989
Int. Cl.[2] G01J 1/42; G01K 17/00
U.S. Cl. 356—222 22 Claims



1. A method for quantizing a radiation beam, including the steps of:

sampling discrete portions of an incident radiation beam with a diffraction matrix to eliminate a substantial portion of the energy of the incident radiation beam;

optically diffracting on-axis the sampled portions of the incident radiation beam to provide quantized radiation beam portions of reduced intensity; and

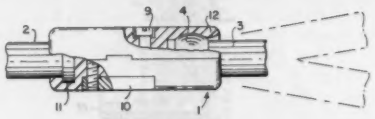
individually detecting the quantized radiation beam portions with a receiving plate having a plurality of sensors affixed thereto.

4,059,360

DEVICE FOR MECHANICAL CONNECTION

Etienne Leon Norbert Teissier, Cogolin, France, assignor to Etat Francais Représenté par de Délégue Ministériel pour l'Armement, Paris, France

Filed July 26, 1976, Ser. No. 708,318
Int. Cl.[2] F16B *2/02*
U.S. Cl. 403—2 4 Claims



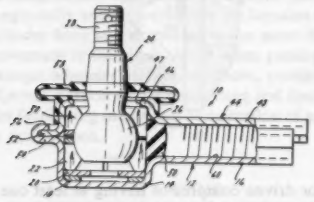
1. A device for providing mechanical connection between a first and a second substantially coaxial element that are mutually subject to traction, said device disconnectable beyond a specific traction threshold and reusable, comprising a male piece fixed to the end of the first element, so as to form a bulge at the end of the first element, and a casing integral with the end of the second element, said casing comprised of elastic material and including a cavity that substantially adapts to the form of said bulge removably received in said cavity, said casing includes a first half and a second half, said halves assembled along a joint plane parallel to an axis that is common to the elements, each of said halves have a central part and including means for securing the central part of said first half to the central part of said second half, and wherein said securing means includes at least one screw, and wherein said casing includes a metallic platelet in which the end of said screw is secured; and wherein said cavity is located outside said central part, said cavity defined by adjacent ends of said halves, said ends separable from each other, and said central part being connected to the end of the second element.

4,059,361

TIE ROD END

William D. Allison, Grosse Pointe Farms, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Division of Ser. No. 593,810, July 7, 1975, Pat. No. 3,988,818.
This application July 2, 1976, Ser. No. 702,380
Int. Cl.[2] F16C *11/00*
U.S. Cl. 403—77 7 Claims



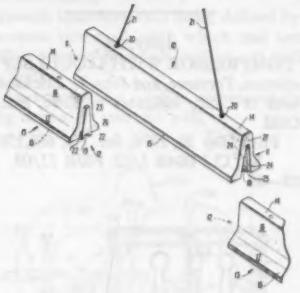
1. A ball and socket joint comprising:
a housing having a socket portion;
a first bearing means having a plurality of circumferentially spaced apart bearing elements positioned in said socket portion;
a ball stud having a ball seated in engagement with said first bearing means and a shank extending from said socket portion;
a second bearing means having a plurality of circumferentially spaced apart bearing elements positioned in said socket portion in enegagement with said ball;
a plastically deformable element situated within said socket portion;
means constructed to transfer a load from said ball stud to said deformable element that is of sufficient magnitude to deform said deformable element;
a closure member having an opening through which said shank extends and a peripheral portion in engagement with said socket portion.

4,059,362

CONCRETE HIGHWAY TRAFFIC BARRICADE HAVING INTEGRALLY FORMED COUPLING

Rodney I. Smith, Rte. No. 1, Midland, Va. 22728

Filed Nov. 24, 1976, Ser. No. 744,800
Int. Cl.[2] E01F *15/00*
U.S. Cl. 404—6 11 Claims



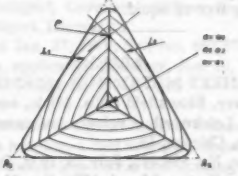
1. In a traffic barrier of the type wherein a series of elongated precast concrete barricades having a uniform cross-section along their respective lengths are joined in end-to-end interengaging, abutting alignment by similar mating tongue-and-groove couplings integrally formed in the respective abutting ends of each of the barricades, each tongue-and-groove coupling consisting of a vertically elongated tongue projecting longitudinally outwardly from the end of one of the abutting barricades and a recess complementary to said tongue being formed in the end of the other of the abutting barricades, said recess extending downwardly to the base of the barricade to permit entrance of the tongue in a vertical direction, the transverse width of the tongue and the recess being greater at their lower ends than at their upper ends to facilitate said entrance.

4,059,363

CUTTING PLATES WITH ROUNDED CUTTING EDGES AND CONCAVE FRUSTOCONICAL CUTTING SURFACES

Gerard Romagnolo, Eybens, France, assignor to Ugine Carbone, Grenoble, France

Filed Mar. 9, 1976, Ser. No. 665,263
Claims priority, application France, Apr. 9, 1975, 75.11727
Int. Cl.[2] B26D *1/00*
U.S. Cl. 407—114 16 Claims



1. A cutting plate of polygonal cross-sectional shape and including a chip-breaker on at least one of its working faces, said plate having an upper surface, a lower surface and a plurality of side surfaces defining said polygonal shape, at least

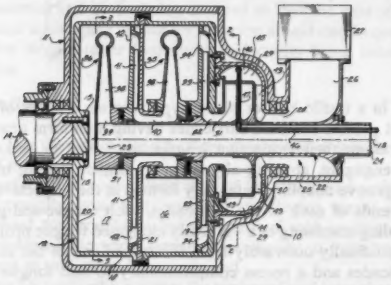
one cutting point on a cutting point plane generally parallel to and below said upper surface, at least two cutting surfaces each defined by at least one conical surface with an axis perpendicular to said cutting point plane, said cutting point including a cutting edge at said cutting plane and comprising a surface generated by an arc of a curve adjacent an intersection between two of said side surfaces, two of said cutting surfaces in the region of said cutting point being joined along an arc of a curve bisecting said cutting point in a plane perpendicular to said cutting point plane wherein a discontinuity is provided by the angle of said two cutting surfaces decreasing as each of said conical cutting surfaces approaches said arc of a curve bisecting said cutting point, and the juncture of said side surfaces and said cutting surfaces comprising a cutting edge defined by a plane Q_a connecting two cutting points, which plane Q_a defines a portion of said polygonal shape.

4,059,364

PITOT COMPRESSOR WITH LIQUID SEPARATOR

Poul H. Andersen, Torrance, and John W. Erickson, Huntington Beach, both of Calif., assignors to Kobe, Inc., Huntington Beach, Calif.

Filed May 20, 1976, Ser. No. 688,176
Int. Cl.[2] B04B *5/02*; F03B *11/08*
U.S. Cl. 415—89 **18 Claims**



1. A pitot compressor comprising
a. a rotary casing mounted for rotation in a selected direction about an axis,
b. a gas supply passage for delivering a gas to be compressed through an outlet of the gas supply passage to the interior of the casing,
c. a compressed gas discharge duct coaxial with the casing,
d. a pitot tube extending radially of said axis in the casing and having adjacent its outer end an inlet facing in a direction opposite to the direction of rotation of the rotary casing, the pitot tube having a diffuser passage connected to the inlet and extending toward the axis to an outlet port connected to the discharge duct, and
e. separating means cooperatively associated with the gas supply passage upstream of the outlet thereof for centrifugally separating liquid from gas in the supply passage, whereby gas delivered to the interior of the casing is essentially free of liquid.

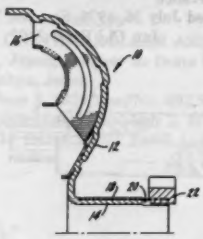
4,059,365

SHEET METAL HUB ASSEMBLY

John Saxon Ivey, Bloomfield Hills, Mich., and Kenneth Albert Braybrook, Letchworth, England, assignors to Borg-Warner Corporation, Chicago, Ill.

Division of Ser. No. 598,441, July 23, 1975, Pat. No. 3,981,068.
This application May 4, 1976, Ser. No. 683,125
Int. Cl.[2] F04D *29/04*
U.S. Cl. 416—174 **1 Claim**

1. An impeller assembly for a hydraulic torque converter constructed of sheet metal and having an axially extending hollow hub portion integral therewith adapted to be connected to drive a fluid pump, the hub member having a thin wall cylindrical bearing member thereon, the bearing member being secured to the hub portion so as to rotate therewith by extrusion of the hub through said bearing, said bearing member providing a wear resistant surface on the sheet metal hub surface.

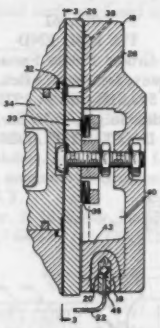


4,059,366

THERMAL OVERLOAD PROTECTIVE SYSTEM

Edwin L. Gannaway, Adrian, Mich., assignor to Tecumseh Products Company, Tecumseh, Mich.

Filed Mar. 26, 1976, Ser. No. 670,646
Int. Cl.[2] F04B *49/06*, *49/10*
U.S. Cl. 417—32 **7 Claims**

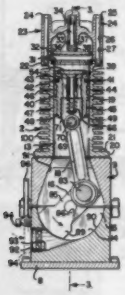


1. In a motor driven compressor having at least one piston reciprocable in a cylinder with a valve device closing the outer end of the cylinder, a cylinder head defining a discharge passage and including a rib protruding into said discharge passage and exposed to gas being discharged from the compressor, and discharge ports from said passage on opposite sides of said rib at the base thereof, a discharge valve interposed between the cylinder and the said passage, said discharge valve opening into said passage in a region spaced from the apex of said rib whereby the gas being discharged through said discharge valve flows along said rib from the apex down opposite lengths thereof to said discharge ports, a blind hole formed in said rib from the side of the head facing away from said passage, and a heat sensitive element mounted in said hole and adapted for connection in controlling relation to the motor driving the compressor.

4,059,367
GASEOUS FLUID COMPRESSING APPARATUS

Richard Clarence Marshall, 408 W. 83rd Terrace, Kansas City, Mo. 64114

Filed Apr. 26, 1976, Ser. No. 680,525
Int. Cl.[2] F04B 23/14, 21/04
U.S. Cl. 417—203 8 Claims



1. A gaseous fluid compressing apparatus having a cylinder with a bore therein, a compressed fluid discharge at one end of the cylinder, a discharge valve at said one end of the cylinder opening in response to fluid pressure in the cylinder bore, a piston reciprocable in the cylinder bore and an intake valve in the piston operating in response to pressure differential on opposed sides thereof, the improvement comprising:

a. a crankcase having walls defining an interior compartment and said cylinder extending therefrom with said cylinder bore communicating with said compartment;

b. a crank rotatably mounted in the crankcase and having a crank throw and opposed counterbalances in said compartment;

c. a connecting rod operably connecting said piston with said crank throw for reciprocating said piston in response to rotation of said crank;

d. said crankcase compartment being defined by surfaces adjacent to the paths of extremities of the crank throw and connecting rod as the crank is rotated;

e. an inlet port in the crankcase for gaseous fluid to be compressed, said inlet port having a passage extending therefrom to said compartment for movement of gaseous fluid from said inlet port to said compartment, said passage communication with said compartment being substantially tangentially and opposite from the location of entry to the cylinder bore and extending in the same direction as the movement of the crank throw when passing adjacent said passage whereby said crank throw, counterbalances and adjacent portion of the connecting rod function as impellers facilitating intake and compression of gaseous fluid to be compressed.

4,059,368
GAS COMPRESSOR UNLOADING MEANS

Wallace A. McGahan, Lawrenceville, N.J.; Paul D. Webb, Tioga, Pa., and Henry W. Morse, Savona, N.Y., assignors to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Division of Ser. No. 577,347, May 14, 1975, Pat. No. 3,989,413. This application June 21, 1976, Ser. No. 698,171
Int. Cl.[2] F04B 49/02; F01C 11/00; F04C 17/04, 23/00
U.S. Cl. 417—243 9 Claims

1. A rotary gas compressor having a plurality of compression chambers, rotary means confined in each of said chambers for displacing and compressing gas in said chambers, spaced-apart gas inlet and outlet port means for each of said chambers, and unloading means for the compressor, comprising:

unloading port means, for each of said compression chambers, each of said unloading port means opening both into its respective compression chamber and externally thereof; and

valving means coupled to said unloading port means operative for independently opening and closing selective ones of said unloading port means; wherein

said rotary means comprises rotors;

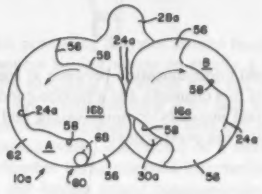
each of said rotors having a first radial sector which defines a hub, a second innermost radial sector which defines a groove, and a third outermost radial sector which defines a tooth;

said outlet port means of a given one of said chambers is cyclically sealed off from said given one chamber, sequentially, by two of said sectors of one of said rotors;

said unloading port means of a given one of said chambers is cyclically sealed off therefrom by only one of said sectors of one of said rotors;

said compression chambers each being defined by an enveloping, arcuate side wall, with which said teeth of said rotors effect a rotary interface, and an end wall joined to said side wall;

said rotors are arranged for rotation within said chambers on axes lying normal to said end wall;



each said gas inlet port means opening onto its respective chamber at a first location;

each said gas outlet port means opening through said end wall onto its respective chamber at a second location, relative to one of said rotation axes, which is spaced apart from said first location a given rotary or angular distance;

each said unloading port means opens onto said end wall at a location which, relative to at least one of said rotation axes, is intermediate said rotary or angular distance;

each said unloading port means comprises a port, a walled cylinder external to or outboard of said chambers, said port being formed in an end of said cylinder, said cylinder having venting means opening through the wall thereof for venting gas therethrough, and said cylinder slidably supporting a port-closure plunger, and said plunger having means cooperative with said port for metering an opening and closing of said port to effect, and to prohibit, a communication of said port with said venting means; and

means interactive with said cylinder for moving said plunger to effect closure and opening of said port.

4,059,369
FUEL INJECTION PUMP

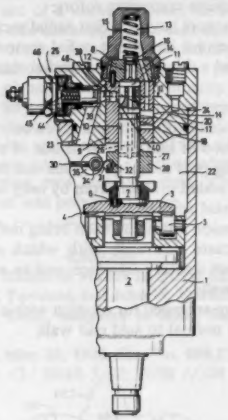
Franz Eheim, Stuttgart, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Jan. 27, 1976, Ser. No. 652,873
Claims priority, application Germany, Jan. 28, 1975, 2503300
Int. Cl.[2] F04B 7/06
U.S. Cl. 417—494 5 Claims

1. In a fuel injection pump for internal combustion engines which includes a housing, a fuel storage compartment in said housing, cylinder means disposed in said housing and a reciprocating and rotating piston moving in said cylinder means and defining a pressure chamber, a plurality of fuel channels in said housing, one terminus of each of said plurality of fuel channels lying in the wall of said cylinder, said piston having radial apertures which cooperate with said termini to thereby pro-

vide rpm-dependent flow control through said plurality of fuel channels, the improvement comprising

at least one connection channel in the cylinder means connected to said plurality to fuel channels for providing



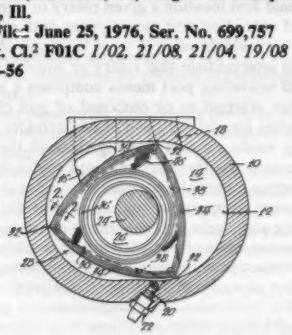
mutual fluid communication between at least two of said plurality of fuel channels, and a suction conduit connected between said mutually communicating fuel channels and said fuel storage compartment.

4,059,370

ROTARY ENGINE HAVING LOW THERMAL CONDUCTIVITY ROTOR

Myron R. Gibson, Edelstein, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed June 25, 1976, Ser. No. 699,757
Int. Cl.[2] F01C *1/02, 21/08, 21/04, 19/08*
U.S. Cl. 418—56 **3 Claims**



1. In a rotary engine having a high surface to volume ratio, the combination of:

a housing having intake and exhaust ports and defining a chamber;

a shaft journalled in the housing to extend through the chamber and having an eccentric within the chamber;

a rotor journalled on said eccentric within said chamber, said rotor having a body consisting essentially of a ceramic material;

seals carried by said rotor sealingly engaging the walls of the chamber; and

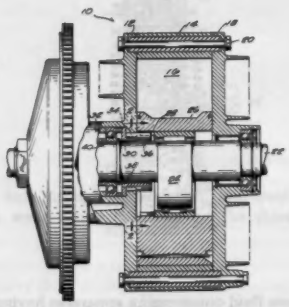
metallic, grooved inserts in said rotor body for receiving the seals in the groove thereof, means placing said insets in tension so that said body is in compression.

4,059,371

ROTARY ENGINE STATIONARY GEAR LOCATING AND TIMING DEVICE

John D. Sheldon, Zion, Ill., assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed Sept. 18, 1975, Ser. No. 614,531
Int. Cl.[2] F04C *1/02;* F16H *1/10, 1/32, 57/02*
U.S. Cl. 418—61 A **4 Claims**



1. A rotary piston engine comprising a housing assembly including a trochoid housing having means at least partially defining a trochoid cavity, a pair of end housings, means for aligning and securing together said end housings and said trochoid housing to further define the trochoid cavity, a shaft rotatably supported in said end housings and having an eccentric portion disposed within the trochoid cavity, a rotary piston rotatably supported on said eccentric portion of said shaft and extending within the trochoid cavity, said rotary piston having an internal timing gear, a stationary gear separate from said end housings and having teeth in mesh with said internal timing gear, and means extending from one of said end housings in interfitting relation with said teeth of said stationary gear for mounting said stationary gear in predetermined fixed relation to said one of said end housings.

4,059,372

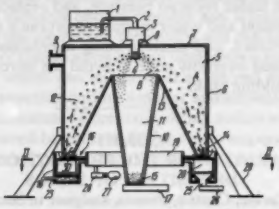
PLANT FOR PRODUCING METALLIC PELLETS FROM SALT-ADDED MAGNESIUM OR ALLOYS THEREOF

Ivan Andreevich Barannik, prospekt Lenina, 182a, kv. 22, Zaporozhie; Anatoly Borisovich Kondratenko, ulitsa Sevastopolskaya, 4, kv. 6, Kalush Ivano-Frankovskoi oblasti; Alexandr Fedorovich Trukhin, ulitsa Zhdanova, 11, kv. 32, Kalush Ivano-Frankovskoi oblasti; Viktor Georgievich Raskatov, ulitsa Khimikov, 14, kv. 18, Kalush Ivano-Frankovskoi oblasti; Ivan Vasilievich Zharovsky, ulitsa Zhdanova, 11, kv. 32, Kalush-Ivano-Frankovskoi oblasti; Viktor Alexandrovich Rudakov, ulitsa Bogdana Khmelnitskogo, 60, kv. 121, Kalush Ivano-Frankovskoi oblasti; Andrei Efremovich Mordkovich, ulitsa 40 let Sovetskoi Ukrainy, 29, kv. 13, and Alexandr Vasilievich Chalov, ulitsa 40 let Sovetskoi Ukrainy, 46, kv. 20, both of Zaporozhie, all of U.S.S.R.

Filed Dec. 6, 1976, Ser. No. 747,814
Claims priority, application U.S.S.R., Dec. 5, 1975, 2196202
Int. Cl.[2] B29C *23/00*
U.S. Cl. 425—8 **3 Claims**

1. A plant for producing metallic pellets from a salt-added magnesium or alloys thereof, comprising: a furnace for melting a salt-added metal; a centrifugal pelletizer with a perforated bowl; a means for feeding the molten metal together with the salt additive to said centrifugal pelletizer; a cylindrical chamber accommodating the perforated bowl of said centrifugal pelletizer and adapted for collecting the pellets formed from the molten metal when the latter is shot out through the perforations in said bowl; a hopper provided in said cylindrical chamber under the coaxially with the perforated bowl; said

hopper dividing said cylindrical chamber into two concentric zones open from below, of which one zone established by said hopper is located centrally in said chamber and is adapted for collecting salvage that results from the pellet formation process, while the other annular-shaped zone is located along the periphery of said chamber and is adapted for pellet collection; a pellet withdrawal mechanism provided under said latter zone; a salvage disposal mechanism provided under said former zone.

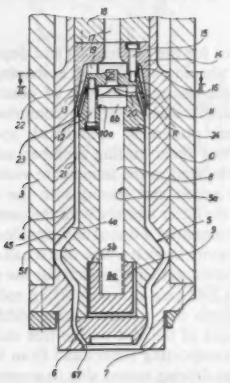


4,059,373

EXTRUDER HEAD

Rudolf Maier, Heidenheim, Germany, assignor to J. M. Voith GmbH, Heidenheim, Germany

Filed Apr. 13, 1976, Ser. No. 676,464
Claims priority, application Germany, Apr. 26, 1975, 2518649; Oct. 10, 1975, 2545415
Int. Cl.² B29F *3/04*
U.S. Cl. 425—192 R 15 Claims



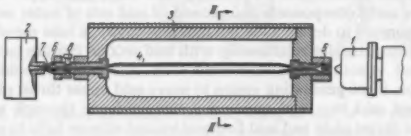
1. In an apparatus for making tubular parisons of synthetic thermoplastic material, an extruder head comprising a hollow outer housing having front and rear end portions; an inner housing having a material-admitting channel and a forward portion extending into said rear end portion; a core coaxially received in said outer housing and having a rear end adjacent said forward portion and a front end defining an annular extrusion orifice with said front end portion, said core and said outer housing further defining an elongated annular compartment communicating with said orifice; and means securing said core to said inner housing, including a section disposed between said forward portion and said rear end, said section and said forward portion defining a first chamber through which the material can flow from said channel toward said compartment, said section and said rear end defining a second chamber through which the material can flow toward said compartment and said section having an opening communicatively connecting said first chamber with said second chamber, a first group of spaced-apart coupling elements extending across said first chamber and connecting said section to said inner housing, and a second group of spaced-apart coupling elements extending across said second chamber and connecting said section to said core, said coupling elements being substantially parallel to the axis of said core.

4,059,374

DEVICE FOR PREPARING POLYMER ARTICLES FROM MONOMERS

Nikolai Alexandrovich Mikhalev, prospekt Tsiolkovskogo, 79a, kv. 64; Boris Petrovich Shtarkman, prospekt Lenina, 65, kv. 63, and Jury Ivanovich Gladyshev, ulitsa Avtomobilnaya, 21, kv. 6, all of Dzerzhinsk Gorkovskoi oblasti, U.S.S.R.

Filed Dec. 16, 1976, Ser. No. 751,523
Int. Cl.² B29F *3/02*
U.S. Cl. 425—207 10 Claims



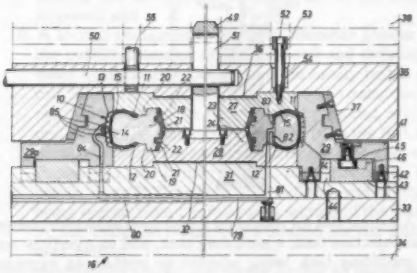
1. A device for producing polymer articles from monomers, comprising: a source having means to supply a monomer, a mold, a means for preparing a polymer melt out of the monomer having an inlet communicating with said source of the monomer and an outlet communicating with said mold, at least one chamber having walls constructed of a flexible resilient material, said chamber being disposed intermediate said inlet and said outlet and having means communicating therewith, said chamber having a height several times less than its length and width, said chamber being disposed in a housing, said housing confining therein a medium, means to pressurize said medium to thereby exert pressure on the walls of said chamber, and means operable to heat said housing and said medium to thereby heat said chamber and the melt therein.

4,059,375

VEHICLE WHEEL PNEUMATIC TYRES AND THE MANUFACTURE THEREOF

Friedrich Koch, Achim, and Lothar Fink, Achim-Baden, both of Germany, assignors to Sopecom S.A. Fribourg, Fribourg, Switzerland

Filed Mar. 30, 1976, Ser. No. 671,782
Claims priority, application Germany, Apr. 5, 1975, 2514973
Int. Cl.² B29C *5/00;* B29H *3/08, 5/02*
U.S. Cl. 425—589 11 Claims



1. In an injection molding apparatus for producing molded articles having a multipart core defining the inner side of a mold cavity, the core being reduced in size about its external periphery by relative displacement of individual parts for the removal of the article from the mold, a multi-part injection

mold, said core inserted into said mold and completely enclosed thereby, said mold having upper, lower and sets of outer mold components, said sets of outer mold components being replaceable to form different sized mold cavities for the successive injection molding actions; the improvement comprising: a first injection molding station for injection molding a first part of said article, said first station disposed in a press, an upper thrust plate associated with said press, a first mold carrier having a first of said sets of outer mold components, a first closure bell for holding said core, said upper and lower mold components and first of said sets of outer mold components to define a first molding cavity, a first injection unit associated with said first molding station, a second injection molding station disposed in said press for molding a second part of said article, a second mold carrier arranged in a force transfer arrangement with said first closure bell, said second mold carrier having a second of said sets of outer mold components, a second closure bell for holding said core, said upper and lower mold components and second of said sets of outer mold components to define a second molding cavity, a base member in a force transfer relationship with said second closure bell, a second injection unit associated with said second molding station, force generating means to move said upper thrust plate toward said base and transmit a closure force through said upper thrust plate and said first and second closure bells to said base for simultaneous molding at said first and second stations, means for transporting said core, said upper and lower mold components with said first part to said second molding station for molding said second part, and means associated with said transporting means for placing and extracting said core, said upper and lower mold components relative to said first set of outer mold components when at said first injection molding station and relative to said second set of outer mold components when at said second injection molding station.

4,059,376

APPARATUS FOR MOULDING HYDRAULIC CEMENT OR THE LIKE MATERIAL

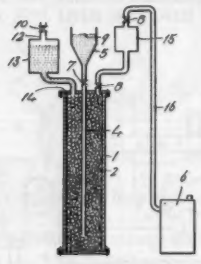
Yasuro Ito; Hideharu Kaga, both of Tokyo; Yasuhiro Yamamoto, Ageo, and Tadayuki Sumita, Tokyo, all of Japan, assignors to Yasuro Ito and Taisei Corporation, both of Tokyo, Japan

Division of Ser. No. 526,825, Nov. 25, 1974, Pat. No. 4,036,922. This application Feb. 28, 1977, Ser. No. 772,421

Claims priority, application Japan, Nov. 24, 1973, 48-131189; Mar. 14, 1974, 49-28598; Mar. 20, 1974, 49-30888; July 23, 1974, 49-83787; July 25, 1974, 49-84673; Oct. 9, 1974, 49-115596

Int. Cl.² B28B *13/02*; B29F *1/00*

U.S. Cl. 425—546 **59 Claims**



1. An apparatus for moulding a hydraulic substance comprising an injection tank, a moulding tank, and an overflow zone, said moulding tank being adapted to contain an aggregate, means for reducing the pressure in the moulding tank and in the overflow zone to a vacuum, means for introducing a cement and water mixture into the injection tank, means for transferring said mixture from the injection tank into the moulding tank in sufficient excess quantity to cause said mixture to overflow from the moulding tank into the overflow zone, and means for returning the overflow zone to at least atmospheric pressure, whereby at least a portion of said excess quantity of said mixture in the overflow zone is returned to the moulding tank to eliminate the voids between the aggregate in the moulding tank created by removing the excess water and entrained air under reduced pressure, and replacing said voids with said cement and water mixture to produce a substantially void-free product, said mixture being maintained in sufficient quantity in said overflow zone to avoid the introduction of air into the moulding tank.

4,059,377

APPARATUS FOR THE PRODUCTION AND DEPOSITION OF BANDS

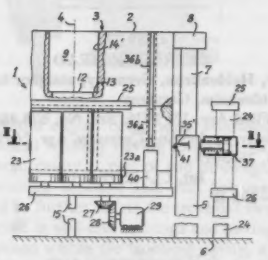
Yves Jean Corbic, Chatou, France, assignor to Societe a Responsabilite Limitee dite: TECCA, France

Filed Feb. 2, 1977, Ser. No. 764,713

Claims priority, application France, Feb. 4, 1976, 76.03100

Int. Cl.² B29C *17/00*

U.S. Cl. 425—305.1 **11 Claims**



1. An apparatus for the production and deposition of bands associated with shaping moulds of a shaping station of an installation for the thermal shaping of containers provided with bands, whereby said apparatus comprises an elongated body at least one preferably cylindrical, so-called winding cavity, at least one fixed cutting member and one movable cutting member located in the immediate vicinity of said cavity, at least one access slot issuing into the said cavity and which connects the latter lateraly with the outside, at least one ejecting plunger mounted without any significant lateral clearance in the said cavity in such a way that it can occupy two end positions in the latter, actuating means for the movable cutting member, at least one pair of transporting rollers located upstream of the access slot, a strip whose width is at the most equal to the height of the slot whose free end is gripped between the said transporting rollers and from whcih the bands are cut, as well as driving means able to sequentially drive the two transporting rollers for the purpose of introducing into the said cavity a strip portion whose length is equal to that of one band, wherein each pre-winding cavity is located below a mould and the body containing the various cavities is integral with the block of moulds, each ejecting plunger is fixed in space on a frame, each mould comprises base plate aligned with the corresponding cavity integral with the ejecting plunger by means of an intermediate supporting member and whose cross-section is smaller than that of the shaping chamber of the mould in such a way that there is a marginal base portion between the side walls and the movable base plate of the mould, whereby the base plate, intermediate supporting member and ejecting plunger are arranged relative to one another and relative to the shaping chamber and the pre-winding cavity in such a way that the upper face of the movable base plate is located in the same plane as the marginal base portion and the intermediate member is located entirely within the said cavity when the ejecting plunger is located at the lower end of said cavity, the intermediate supporting member has a cross-section which is smaller than that of the ejecting plunger, each pair of transporting rollers is mounted so as to be fixed in space

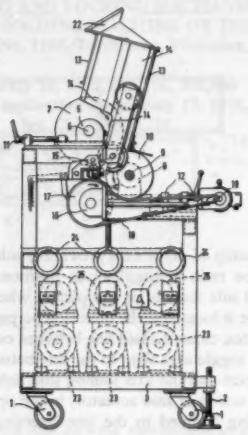
and extends parallel to the supporting member substantially over the entire height of the latter starting from the ejecting plunger, the actuating means for the movable cutting member comprise a control member which is independent of the movements of said movable cutting member and which are parallel to the axes of the mould and the cavity, and the driving means for each pair of transporting rollers comprises a reverse movement control which can be operated at the end of the cutting stroke of the movable cutting member and automatically stops the reverse movement of the transporting rollers as soon as the latter have moved back the end of the strip engaged in the slot to an area located outside the displacement path of the mould or moulds.

4,059,378

METHOD AND A MACHINE FOR REMOVING FROM THEIR MOLDS MOLDINGS OF CONFECTIONERY MASSES WHICH HAVE BEEN FORMED INTO CHOCOLATE CENTERS, BARS OR OTHER SINGLE OR CONTINUOUS MOLDINGS

Helmut Sollich, Kalletal-Talle, Germany, assignor to Sollich AG, Bad Salzuflen, Germany

Filed July 20, 1976, Ser. No. 707,096
Claims priority, application Germany, Dec. 9, 1975, 2540613
Int. Cl.² A23G *3/12*
U.S. Cl. 425—362 **4 Claims**



1. A machine for molding confectionery masses into chocolate centers, bars, or other continuous or separate moldings, comprising:

a molding cylinder provided with molding recesses in its circumferential surface;

a suction belt disposed below and partially enclosing said molding cylinder, for removal of formed parts from the molding recesses of the molding cylinder;

a single intake cylinder disposed immediately adjacent to said molding cylinder, said intake cylinder having a larger diameter than said molding cylinder, said intake cylinder being operable to press the mass into the molding recesses of the molding cylinder;

feed hopper means, disposed above said intake cylinder and said molding cylinder, for directing feed onto said intake cylinder and onto said molding cylinder upstream of said intake cylinder;

drive means operable to cause rotation of said molding cylinder and said intake cylinder and to dirve said suction belt; and

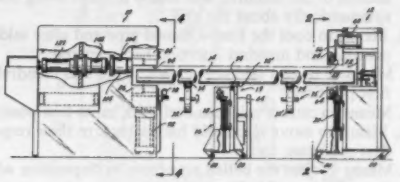
control means operable to control the rotation velocities of said molding cylinder and said intake cylinder.

4,059,379

METHOD OF BELLING PLASTIC PIPE AND APPARATUS THEREFOR

Wolfram G. Korff; Vernon V. Emery, both of Granada Hills; Joseph Kim Bond, North Hollywood, and Joseph Marcella, Granada Hills, all of Calif., assignors to Emery Company, Inc., Pacoima, Calif.

Filed Aug. 26, 1976, Ser. No. 717,874
Int. Cl.² B29C *17/00*
U.S. Cl. 425—393 **18 Claims**



4. Apparatus for compression molding an end of the thermoplastic pipe to bell the same, said apparatus comprising:

a. A heating area to heat-soften the end of the pipe;

b. A belling station;

c. Conveyor means to dispose the end of a pipe to be belled in said heating area and to retain said pipe-end in said heating area for a predetermined period to heat-soften said pipe-end and then to move the pipe transversely to its axis so that said heat-softened pipe-end is disposed in the belling station;

d. A belling mandrel, said belling mandrel being co-axially aligned with, but, in its first position, spaced from the heat-softened end of said pipe, said mandrel being movable from its said first position to a second position wherein the mandrel is inserted in the heat-softened pipe-end, said mandrel having a leading substantially cylindrical nose with an outside diameter just sufficiently smaller than the inside diameter of the pipe so as to be insertable therein, and a following section configured to the desired internal configuration of the finally belled pipe-end;

e. A pair of mating mold halves, said mold halves being disposed in transverse alignment with the heat-softened pipe-end when disposed in said belling station, and said mold halves being movable from a first position spaced from each other to a second position wherein said mold halves are tightly closed together about the heat-softened pipe-end, when in said belling station each of said mold halves defining one-half of a cavity, said cavity having

i. A first inner portion which coincides with the outside diameter of the plastic pipe as it arrives in the belling station, and is disposed inwardly out of the softened pipe-end; and

ii. A second portion with an inside diameter greater than the outside diameter of the pipe-end and defining the outer configuration desired for the finally belled pipe-end, said second portion of the cavity the outer configuration desired for the finally belled pipe-end, said second portion of the cavity extending from the first inner portion axially beyond the softened pipe-end when disposed in said belling station, the walls of the mold halves when so closed together defining said cavity and being spaced from the following section of the mandrel by the thickness of the walls desired for the pipe-end after belling.

f. A compression sleeve, said sleeve having an inside diameter just sufficiently greater than the outside diameter of the following section of the mandrel as to be slidable thereover, and an outside diameter just sufficiently smaller than the inside diameter of the mold walls defining the second portion of the cavity as to be slidable therein, said sleeve having an annular end edge face, and said sleeve being slidable over said mandrel between a first position

remote from the mandrel nose and a second position over the following section of the mandrel toward said mandrel nose to contact said transverse annular end wall of the pipe-end;

g. Means to force said sleeve slidably axially over said mandrel after said mandrel has been inserted in said heat-softened pipe-end from the sleeve's first position to its second position to cause said annular end edge face to contact and compress the said annular end wall of the heat-softened pipe-end as it is disposed in the spacing between the walls of the mold halves defining said cavity and the following section of the mandrel, said means to force being disposed symmetrically about the axis;

h. Means to cool the heat-softened pipe-end after said compression and mandrel insertion has occurred;

i. Means to retract said sleeve back along said mandrel to its first position;

j. Means to retract said mandrel back to its first position;

k. Means to move said mold halves back to their respective first positions; and

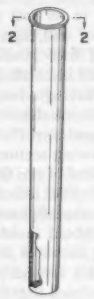
l. Means to eject the belled pipe from its disposition wherein its end is in said belling station.

4,059,380

DEEP-DRAW THERMOFORMING OF THERMOPLASTIC SHEET

Arnis Judzis, Bedford Heights, and Thomas J. Bond, Chardon, both of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Filed Aug. 26, 1976, Ser. No. 717,935
Int. Cl.[2] B29C *17/03*
U.S. Cl. 425—298 **4 Claims**



1. In an apparatus for deep drawing of hollow articles from heated thermoplastic sheet comprising a heated mandrel and a mold cavity, means for securing the heated thermoplastic sheet in a position between the mandrel and mold cavity and means for moving the mandrel through the heated thermoplastic sheet so as to draw the heated thermoplastic onto the walls of the mandrel and into the mold cavity, the improvement comprising locating a domed guide located directly above and at the top of the mold cavity, said domed guide having internal walls which are greater in diameter than the internal diameter of the mold cavity and said domed guide being equipped with a hardened metal insert cutter located near the entrance to the mold cavity.

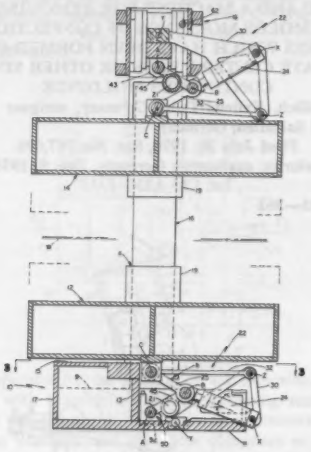
4,059,381

TOGGLE PRESS

Charles M. Schott, Jr., Gloucester, Mass., assignor to Gloucester Engineering Co., Inc., Gloucester, Mass.

Filed Dec. 6, 1976, Ser. No. 747,934
Int. Cl.[2] B29C *3/00, 17/00;* B30B *1/16*
U.S. Cl. 425—406 **11 Claims**

1. A toggle press of the type comprising at least a lower platen mounted to move on guides of a frame between an open position accessible to a worker on the ground and a closed position in response to a toggle linkage, the toggle linkage comprising frame and platen links connected at pivots respectively on the frame and platen, the line between said pivots being parallel to the direction of said guides, said links joined at an intermediate actuating axis to which is also connected an actuator mounted on its other side to a second, reaction-force-absorbing linkage, said platen having a working face directed upwardly, the toggle linkage adapted to raise said platen to close said press,said second linkage comprising a lever and a link, said lever pivoted at one end at a fixed axis to the frame and at its other end to one end of said link, the other end of said link pivoted to the platen in the vicinity of said platen axis, said actuator extending between said toggle actuating axis and a reaction point located in the mid-region of said lever between its said end pivots, the improvement comprising the geometri-



cal relationship of pivot axes providing enhanced actuator-to-toggle force ratio at toggle-open position without applying detrimental side loading on the platen, wherein said fixed axis of said lever is located in the direction perpendicular to the axis of said guides, closer to said line between centers of said frame and platen toggle axes than to the line between centers of said reaction point and the axis joining said link to said lever, and the line of action of said actuator, in the open position of said toggle, being inclined to the line bisecting the toggle angle defined at the actuating axis by the frame and platen toggle links, said inclination being in the direction downwardly progressing away from said toggle axis, toward the ground, and the fixed axis for the frame link of the toggle linkage being immediately adjacent to the ground, thereby enabling said open position to be at a convenient height to said worker.

4,059,382

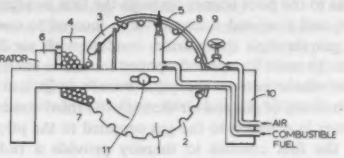
APPARATUS FOR PROCESSING TOP ENDS OF ROD-LIKE RESIN ARTICLES

Hisawo Kobayashi, Funabashi, and Takehiko Watanabe, Saitama, both of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Mar. 25, 1977, Ser. No. 781,169
Claims priority, application Japan, Sept. 14, 1976, 51-124095[U]
Int. Cl.[2] B29C *17/00*
U.S. Cl. 425—446 **4 Claims**

1. An apparatus for processing the ends of rod-like resin articles which comprises a cylindrical rotary member having

slits on the peripheral surface thereof, each slit being adapted to contain one rod-like resin article therein, and a processing



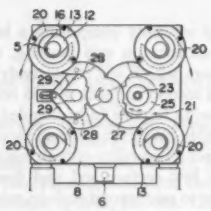
tool disposed in the path of travel of the rod-like resin articles for treating the end thereof.

4,059,383

MOLD OPENING AND LOCKING MECHANISM IN AN INJECTION MOLDING MACHINE OR THE LIKE

Shigeru Tsutsumi, No. 1165, Toyamacho, Yonezawa, Yamagata, Japan

Filed July 14, 1975, Ser. No. 595,980
Claims priority, application Japan, July 17, 1974, 49-81175
Int. Cl.² B29C 1/16
U.S. Cl. 425—451.6 8 Claims



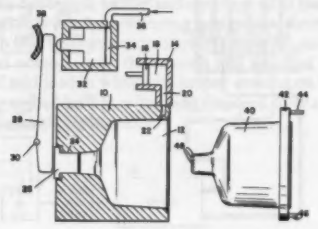
1. A mold opening and locking mechanism in an injection molding machine comprising a fixed mold means mounting a first mold half, tie bars extending from said fixed mold means, a movable mold means movable along said tie bars, said movable mold means comprising a mold supporting plate mounting a second mold half, said movable mold means further comprising a rear plate and a toggle means interposed between said rear plate and said mold supporting plate, said movable mold means being movable to an operable position wherein said second mold half is disposed generally in a mating position with said first mold half, a lock member on said tie rods, said rear plate having means defining openings through which said tie rods and said lock member are passable, said toggle means being connected to one side of said rear plate, said lock member being disposed on an opposite side of said rear plate and being spaced from said rear plate to define a space therebetween when said movable mold means is in said operable position, a locking plate means movable into a locking position into said space, said movable mold means further comprising actuating means operable to actuate said toggle means such that said actuating means and said toggle means are operable to forcibly clamp said two mold halves together when said locking plate means is in said locking position and said movable mold means is in said operable position.

4,059,384

TWO-STEP INJECTION MOLDING

Charles M. Holland, San Lorenzo, and Lawrence W. Parrack, Hayward, both of Calif., assignors to Misto$_2$Gen Equipment Co., Oakland, Calif.

Division of Ser. No. 542,332, Jan. 20, 1975, Pat. No. 3,996,329.
This application July 7, 1976, Ser. No. 703,142
Int. Cl.² B29F 1/06
U.S. Cl. 425—577 4 Claims



1. Apparatus for forming plastic articles having relatively thin wall portions, said apparatus comprising:

a cavity having an interior configuration generally conformed to the exterior of the plastic article to be formed, said cavity having an aperture adjacent the portion of the cavity adapted to form the thin portion of the article;

a primary core having an exterior configuration conformed to the interior configuration of the plastic article;

means operable to insert the primary core into the cavity to form a mold;

means operable to inject molten plastic into the mold;

a secondary core located in the aperture in the cavity; and

means operable to project the secondary core partially into the mold as molten plastic is injected into the mold to thin the plastic adjacent the secondary core, said secondary core being fully projected into the mold prior to the termination of said injecting so that the molten plastic is compressed into the mold, the projected secondary core and the primary core defining a space therebetween that is no greater than approximately 0.005 inch.

4,059,385

COMBUSTION MONITORING AND CONTROL SYSTEM

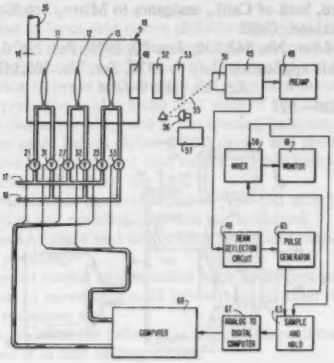
Louis Gulitz, Yorktown Heights; Theodore William Kwap, Brewster; Walter Irving Lisle, Stone Ridge, all of N.Y.; Daniel Francis O'Kane, Morgan Hill, Calif., and Michael Robert Poponiak, Newburgh, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed July 26, 1976, Ser. No. 708,527
Int. Cl.² F23N 5/10
U.S. Cl. 431—12 8 Claims

1. A real time monitoring and control system for adjusting combustion in a system having air and fuel supplies to at least one flame to optimum burning efficiency, including

sensing means responsive to a preselected portion of the emission spectrum of the flame for producing an electrical output signal proportional to the temperature of the flame,

said sensing means having a sensitivity of at least 0.2 amps watt^{-1} cm.$^{-2}$, and



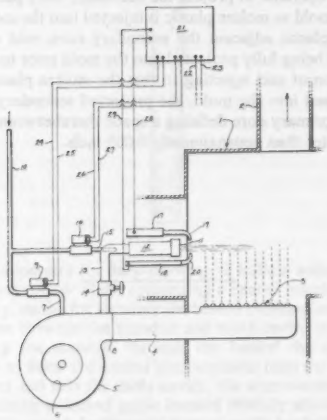
computer means responsive to said sensing means for adjusting the air fuel ratio of said supplies to maximize the burning temperature of said flame.

4,059,386

COMBUSTION HEATING APPARATUS TO IMPROVE OPERATION OF GAS PILOT BURNERS

John P. Eising, Oconomowoc, Wis., assignor to A. O. Smith Corporation, Milwaukee, Wis.

Filed Jan. 21, 1976, Ser. No. 651,217
Int. Cl.^{2} F23Q *9/14*
U.S. Cl. 431—43 **1 Claim**



1. Combustion heating apparatus to improve operation of a gas pilot burner by providing a construction to supply a pressurized air-gas combustion mixture, a main gas burner and a pilot burner, a spark igniter and a flame sensor assembled with the pilot burner, a first conduit connected to the source of gas and to the pilot burner to supply gas to the pilot burner, a first solenoid valve disposed in the first conduit to control the flow of gas through the first conduit to the pilot burner, a second conduit connecting the source of gas to the main gas burner, a blower connected to the second conduit and adapted to force premixed air and gas to the main burner through the second conduit, a plenum chamber disposed on the discharge side of the blower, a mixing chamber provided at the rear portion of the pilot burner, a third conduit extending between the mixing chamber of the pilot burner and the plenum discharge chamber of the blower, electrical control means activated when heat is called for to start the blower and initially supply air to the pilot burner through the third conduit and simultaneously establish a spark by the igniter to open the first solenoid valve to also supply gas to the pilot burner through the first conduit to light said pilot, and a second solenoid valve located to control the flow of gas through the second conduit with air from the blower to the main burner and opened to initiate such gas flow when the sensor proves the pilot burner is lit and to then supply a mixture of gas and air through the third conduit to the pilot burner in addition to the gas supplied to the pilot burner through the first conduit to thereby provide a richer pilot flame which is not adversely affected by varying pressures in the main gas burner combustion chamber.

4,059,387

FLASH LAMP UNIT

Petrus Johannes Julius Witterick, and Joannes Henricus Franciscus Sieben, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 22, 1976, Ser. No. 668,944
Claims priority, application Netherlands, Apr. 14, 1975, 7504397
Int. Cl.^{2} F21K *5/02*; G03B *15/02*
U.S. Cl. 431—93 **3 Claims**

1. A flash lamp assembly comprising a housing, first and second opposed surfaces on said housing, first and second connection members which are respectively located on said opposing first and second surfaces of said housing, each connection member being suitable to be coupled to an associated camera, said assembly comprising first and second pluralities of flash lamps, said second plurality of flash lamps being disposed proximate to said first surface and said first plurality being disposed proximate to said second surface, said second connection member cooperating with only said second plurality of flash lamps and said first connection member cooperating only with said first plurality of flash lamps to ignite the lamps in said first and second pluralities respectively, said assembly cooperating with the associated camera to rotate about an axis of rotation, said assembly including a plurality of percussion springs, each lamp in said assembly being ignitable by an associated percussion spring locked in a tensioned position; and means to release a percussion spring cooperating with a lamp in said first plurality of lamps upon movement in a first axial direction and to release a spring cooperating with a lamp in said second plurality upon movement in a second axial direction, said means including a plurality of elongated members extending between said first and second connection members.

4,059,388

PHOTOFLASH LAMP

John W. Shaffer, Willamsport, Pa., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Continuation-in-part of Ser. No. 629,159, Nov. 5, 1975, abandoned. This application Apr. 5, 1976, Ser. No. 673,569
Int. Cl.^{2} F21K *5/02*
U.S. Cl. 431—95 R **12 Claims**

1. A photoflash lamp comprising:
an hermetically sealed, light-transmitting envelope;

a quantity of filamentary combustible material located within said envelope;
a combustion-supporting gas in said envelope at an initial fill pressure exceeding one atmosphere;
and a non-filament type ignition means disposed in said envelope in operative relationship with respect to said combustible fill material and adapted to be ignited by a high voltage pulse, said ignition means including a pair of lead-in wires extending into said envelope in a spaced

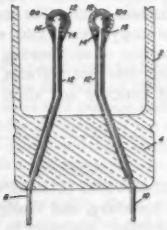
relationship, and a mass of primer material covering a portion of at least one of said lead-in wires within said envelope, said primer material comprising a particulate fuel, one or more oxides of metals having a boiling point substantially above 2097° C, said metal oxides being substantially nonconductive electrically and having a lower free energy of formation than the oxides of said fuels, and a binding agent, said primer material being free of oxidizer salts.

4,059,389

PHOTOFLASH LAMP AND METHOD OF MAKING SAME

Donald E. Armstrong, Williamsport; Ronald E. Sindlinger, Muncy; Bernard Cohen; John E. Tozier, both of Williamsport, all of Pa., and Emery G. Audesse, Beverly, Mass., assignors to GTE Sylvania Incorporated, Stamford, Conn.

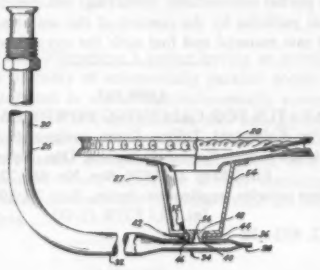
Filed Sept. 7, 1976, Ser. No. 721,604
Int. Cl.² F21K *5/02*
U.S. Cl. 431—95 R **37 Claims**



1. A photoflash lamp comprising:
an hermetically sealed, light-transmitting envelope;
a quantity of filamentary combustible material located within said envelope;
a combustion supporting gas in said envelope;
and ignition means disposed in said envelope in operative relationship with respect to said filamentary combustible material, said ignition means including a pair of lead-in wires sealed through and extending inside said envelope in a spaced apart relationship, the termination of each of said lead-in wires within said envelope having a smooth and rounded configuration of larger diameter than the remainder of the wire, an insulating material coated on substantially the full length within said envelope of at least one of said lead-in wires for preventing preignition short circuits through said filamentary combustible material, and primer material coated about the smooth and rounded terminations of said lead-in wires, the primer coating on the insulatingly coated lead-in wire being disposed over said coating of insulating material.

4,059,390

Patent Not Issued For This Number



4,059,391

PROCESS FOR PRODUCING REFRACTORY MATERIAL

Alan M. Hart, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Mar. 3, 1976, Ser. No. 663,384
Int. Cl.² F27B *15/00*; C04B *35/00*
U.S. Cl. 432—13 **10 Claims**

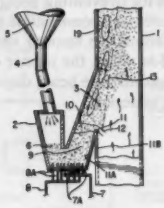
1. In a process for the densification of calcined magnesium oxide by sintering compacts of particles of the calcined magnesium oxide, the improvement which comprises:
a. heating the compacts within the temperature range of from about 1450° C to about 1550° C in a fluidized bed of particles containing magnesium oxide; and
b. retaining the compacts within the fluidized bed of particles for a sufficient time to sinter the compacts to a material having a bulk density of at least about 93 percent of the theoretical bulk density of the calcined magnesium oxide compacts heated in the fluidized bed.

4,059,392

CALCINATION OF PULVEROUS MATERIAL

Jorn Touborg, Copenhagen Valby, Denmark, assignor to F. L. Smidth & Co., Cresskill, N.J.

Division of Ser. No. 423,436, Dec. 10, 1973, Pat. No. 3,955,995.
This application Jan. 28, 1976, Ser. No. 653,025
Claims priority, application United Kingdom, Dec. 11, 1972, 57071/72
Int. Cl.² F27B 15/00
U.S. Cl. 432—58 24 Claims



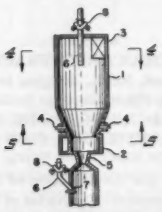
1. A calcination plant for treating a preheated, pulverous raw material consisting entirely of, or at least containing a portion of, lime comprising a conduit, means for passing a flow of oxygen-containing gas upwardly through said conduit, a mixing chamber positioned adjacent said conduit defining a mixing zone for mixing preheated raw material and a fuel, means for separately and continuously feeding fuel and preheated raw material to said mixing zone for accumulating and substantially and uniformly intimately mixing said fuel and preheated raw material prior to calcination to provide a suspension of a fuel gas and raw material particles, said mixing zone being positioned adjacent said conduit and communicating therewith such that the suspension of fuel gas and raw material particles are drawn from said mixing zone into said conduit by said flow of oxygen-containing gas so as to contact the oxygen-containing gas flowing up through said conduit to become entrained by said oxygen-containing gas to provide at least a partial substantially isothermal calcination of said raw material particles by the contact of the uniformly mixed preheated raw material and fuel with the oxygen-containing gas.

4,059,393

APPARATUS FOR CALCINING POWDER MATERIALS

Toshihiro Kobayashi, Tokyo, Japan, assignor to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Ote, Japan

Filed May 25, 1976, Ser. No. 689,725
Claims priority, application Japan, June 20, 1975, 50-74075
Int. Cl.² F27B 15/00
U.S. Cl. 432—58 2 Claims



1. An apparatus for calcining powder materials consisting of:

a. a furnace body having a closed top portion and a tangential gas exhaust opening located at the top portion, said furnace body being in the form of a cylinder;

b. a volute chamber attached to the lower end portion of said furnace body for inducing combustion air into said furnace body so that an upwardly swirling gas flow is created along the furnace wall, while a negative pressure region is created along the furnace wall, while a negative pressure region is developed at the center of said furnace;

c. a kiln exhaust duct connected to the center of the bottom of said volute chamber so that the kiln exhaust may be induced upwardly toward the center portion of said furance body;

d. a plurality of burners attached to the lower end portion of said furnace body, and

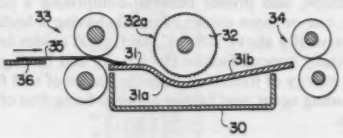
e. a material feeding device comprising a material chute connected to said kiln exhaust duct so that the raw material particles are supplied to said negative pressure region of the furnace body after being suspended in said kiln exhaust.

4,059,394

HEAT FIXING APPARATUS FOR USE IN A WET ELECTROPHOTOGRAPHIC COPYING MACHINE

Kenzo Ariyama, Tokyo; Hiroshi Mano, Yokohama, and Shinichi Kamiyama, Tokyo, all of Japan, assignors to Ricoh Co., Ltd., Japan

Filed Sept. 2, 1975, Ser. No. 609,550
Claims priority, application Japan, Sept. 5, 1974, 49-102243
Int. Cl.² F27B 9/28; G03G 15/00
U.S. Cl. 432—59 3 Claims



1. A heat fixing apparatus, for use in a wet electrophotographic copying apparatus for fixing a toner image carried on one surface of wet-developed copy sheets, comprising, in combination, heating means disposed along a path of movement of the wet copy sheets and including means forming a heating surface for sliding contact with the opposite surface of each sheet, said heating surface including, in the direction of travel of the copy sheets, a substantially planar sheet entry portion followed by a downwardly deflected, upwardly concave portion in turn followed by an upwardly extending sheet exit portion; heat source means operable to heat said heating surface; a rotatably mounted guide roller having a knurled peripheral surface facing said concave surface portion and spaced therefrom by a distance in excess of the thickness of the copy sheets, said roller being rotatable with a peripheral speed equal to the speed of travel of the copy sheets along said path of movement; and copy sheet feeding means, at a position upstream of said guide roller, operable to feed the copy sheets in said direction of travel toward said guide roller; the knurled peripheral surface of said guide roller engaging the copy sheets and deflecting the copy sheets into engagement with said concave surface portion of said heating surface, and the copy sheets, due to their inherent stiffness, remaining resiliently engaged with said concave and sheet exit portions of said heating surface.

4,059,395

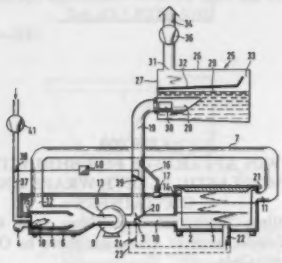
DEVICE FOR REMOVING CARBONIZABLE RESIDUES

Dieter O. Strunz, Nurnberg, and Wolfgang Kern, Ebertraunsdorf, both of Germany, assignors to Siemens Aktiengesellschaft, Erlangen, Germany

Filed Mar. 15, 1976, Ser. No. 667,142
Claims priority, application Germany, Mar. 21, 1975, 2512603
Int. Cl.² F23J 15/00; F27B 5/04
U.S. Cl. 432—72 9 Claims

1. Device for removing carbonizable residues comprising a closed furnace heatable to low-level carbonization temperature, said furnace having an outlet for carbonization gases

formed therein, means for burning off carbonization gases from carbonizable residues and utilizing the heat of combustion therefrom for heating the furnace, said means comprising a burner and a combustion chamber connected to said burner and forming part of a hot gas circulatory system, said hot gas circulatory system also including a container wherein said furnace is disposed so as to be heatable by hot gas circulating



through said hot gas circulatory system, and a hot gas return line connecting said container with a mixing chamber communicating with said combustion chamber, a carbonization gas return line connecting said furnace and said combustion chamber for returning to said combustion chamber carbonization gases formed in said furnace, and an inert gas line communicating with the interior of said furnace for supplying inert gas thereto.

4,059,396

CEMENT MANUFACTURE

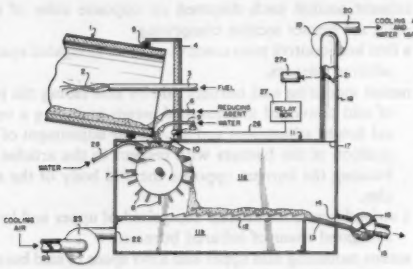
Tage Halfdan Dan, Copenhagen Valby, Denmark, assignor to F. L. Smidth & Co., Cresskill, N.J.

Filed Oct. 2, 1975, Ser. No. 618,819

Claims priority, application United Kingdom, Oct. 3, 1974, 42989/74

Int. Cl.² F27D *15/02*; F26B *19/00*

U.S. Cl. 432—78 **14 Claims**



1. A plant for producing cement which comprises:

a. an inclined rotary kilm for burning cement clinker having an upper material inlet and portion and a lower material outlet end portion for discharge of the clinker;

b. stationary means positioned and adapted to spray the cement clinker with a reducing agent immediately prior to discharge of the clinker from the kiln proper;

c. a cylindrical drum rotatable about its axis positioned adjacent the lower material outlet end portion of the kiln, said cylindrical drum having on its surface means defining at least one compartment configured to receive discrete portions of the clinker discharged from the kiln;

d. means to spray cooling liquid such as water onto the clinker substantially immediately after said clinker is discharged from the kiln and while being trasnferred onto said cylindrical drum;

e. clinker support means positioned below said cylindrical drum and adapted to receive clinker transferred from said cylindrical drum and to facilitate movement of the clinker away from said cylindrical drum while simultaneously being cooled thereon;

f. casing means to enclose the atmosphere adjacent said lower material outlet end portion of the kiln in substantially sealed relation therewith;

g. stationary pipe means positioned to supply a portion of a cooling liquid such as water successively into at least one of the compartments of said cylindrical drum prior to receipt of hot clinker into said compartment; and

h. means to control the pressure of the atmosphere within said casing means so as to be less than the pressure of the atmosphere within the material outlet end portion of the kiln so as to prevent cooling liquid evaporating from the cement clinker exiting the kiln from entering the kiln proper, thereby maintaining at minimum levels the liquid contact and heat losses occurring within the kiln proper.

4,059,397

ROTARY KILN

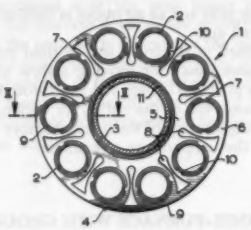
Josef Adler, Pinkmuhlenweg 16, 6101 Nieder-Ramstadt, Germany

Filed Apr. 20, 1976, Ser. No. 678,642

Claims priority, application Germany, May 2, 1975, 2519458

Int. Cl.² F27D *15/02*

U.S. Cl. 432—80 **15 Claims**



1. A rotary kiln comprising a casing having an annular periphery and a plurality of substantially parallel cooler tubes uniformly distributed in a row circumferentially around the casing at its outlet end and mounted on said casing periphery by common annular support means, characterized in that said annular support means comprises radially inner and outer substantially annular zones which are flexibly connected together in the radial direction and between which are disposed said cooler tubes.

4,059,398

FOOD OVEN

Elvis Simon Zimmer, Cedar, and David Allen Hassell, Coon Rapids, both of Minn., assignors to Jeno F. Paulucci, Duluth, Minn.

Filed Apr. 12, 1976, Ser. No. 676,211

Int. Cl.² F27B *9/00*

U.S. Cl. 432—121 **31 Claims**

1. An oven of the conveyor type having a heatable inner oven chamber and an outer shell coolable by a forced flow of ambient air between the oven chamber and the outershell, comprising:

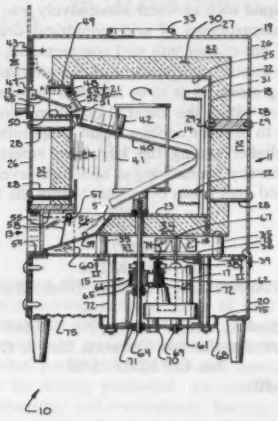
a. a base;

b. a metal shell mounted atop of and on the base and forming together with the base a heatable oven chamber having an electric heater therein for heating of the chamber;

c. a conveyor mounted within the oven chamber for moving an item to be heated through the oven chamber during heating of such item;

d. means for driving the conveyor;

e. means for providing access to the oven chamber, for loading and unloading items upon the conveyor;
f. a layer of thermal insulation mounted around and enclosing the oven chamber metal shell;
g. an exterior cabinet shell mounted outside of the insulation, the cabinet shell being spaced outwardly from the insulation, with there being an air passageway between the oven chamber insulation and the cabinet shell, the passageway



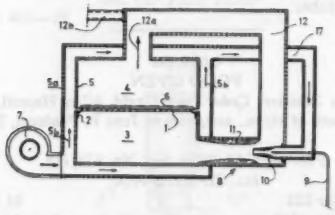
having an air inlet and an air outlet in fluid communication with ambient; and
h. a fan mounted in the oven and in fluid communication with the passageway for moving a flow of ambient air through the inlet and thence into and through the passageway and thence out of the outlet, for cooling the exterior cabinet during heating of the oven chamber to a temperature above the temperature of ambient.

4,059,399

COOLED TUNNEL-FURNACE WITH GROUND EFFECT

Michel Jean Jacques Cellier, Hendaye; Jean-Claude Guitton, Tarnos; Jean-Claude Scholle, Arcangues, and Stephane Georges Jean-Marie Viannay, Plaisir, all of France, assignors to Bertin & Cie, Plaisir, France

Filed Feb. 27, 1976, Ser. No. 661,985
Claims priority, application France, Mar. 4, 1975, 75.06742
Int. Cl.² F27B 9/00
U.S. Cl. 432—121 **10 Claims**



1. A ground-effect type tunnel furnace of the kind including a cooling jacket through which fluid is circulated, and a permeable hearth device subdividing said tunnel furnace along its entire length on the one hand into a succession of pneumatic boxes and on the other hand into a work corridor for the accomodation of the articles to be processed adjacent said permeable hearth device,

wherein the improvement comprises

duct means connecting said cooling jacket to said pneumatic boxes, a burner in said duct means, and a fuel supply line leading to said burner,

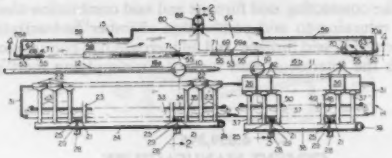
whereby said fluid after having circulated through said jacket and having been thereby heated is fed to said burner which in turn delivers burnt gases to said pneumatic boxes and thence across said permeable hearth device to levitate said articles by ground effect.

4,059,400

OVEN APPARATUS FOR SHRINKING THERMOPLASTIC SLEEVE WRAPS ON GLASS CONTAINERS

Russell William Heckman, Perrysburg, and George Allen Nickey, Toledo, both of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed Mar. 31, 1976, Ser. No. 672,228
Int. Cl.² F27B 9/14
U.S. Cl. 432—124 **10 Claims**



1. An apparatus for heat shrinking a pre-oriented plastic sleeve on the exterior of an article comprising

conveyor means moving the articles in vertical position and having sleeves of heat shrinkable plastic carried exteriorly thereon in a horizontal straight line path,

an elongated oven comprised of a heater section and an exhaust section each disposed on opposite sides of said path, the burner section comprising

a first heat control zone comprised of an elongated span of infrared burners,

means mounting said burners side by side facing the path of said conveyed articles, said means including a vertical height adjustment and an angular adjustment of the position of the burners with respect to the articles for locating the burners opposite the mid body of the articles,

a second heat control zone comprised of upper and lower elongated spans of infrared burners,

means mounting said upper and lowr spans of said burners individually, each said means including a vertical height adjustment and an angular adjustment of the position of the upper and lower burners with respect to the articles for respectively locating the upper span of burners directed at the upper portion of the articles and the lower span of burners directed at the lower portion of the articles, and

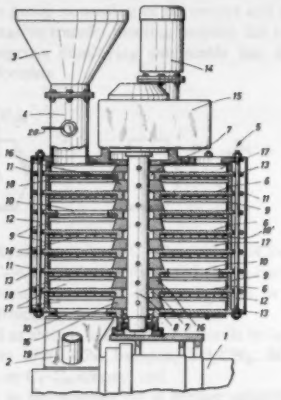
the exhaust section including means for moving air across the oven and into said exhaust section, a facing opposite the burner section thereof, plural horizontal rows of exhaust ports arranged along said facing, plural sets of dampers, and means supporting said dampers in said exhaust ports for movement with respect to said sets of the exhaust ports in each of the horizontal rows thereof, each of said dampers being operable for opening and closing one or more of the exhaust ports in the rows thereof for regulating movement of air within the oven.

4,059,401

SCRAPER FLIGHT CONVEYOR FOR CONVEYING PREHEATED THERMOPLASTIC BULK MATERIAL TO A SCREW EXTRUDER

Wilhelm Hanslik, Vienna, Austria, assignor to Krauss-Maffei Austria Gesellschaft m.b.H., Asten, Austria

Filed Apr. 14, 1976, Ser. No. 676,931
Claims priority, application Austria, Apr. 16, 1975, 2915/75
Int. Cl.[2] F27B 9/02
U.S. Cl. 432—132 3 Claims



1. In combination with a screw extruder for thermoplastic bulk material, the screw extruder having an inlet: a scraper flight conveyor for preheating the thermoplastic bulk material and for feeding the preheated bulk material to the inlet of the screw extruder, the scraper flight conveyor comprising

a. a delivery end receiving the thermoplastic bulk material,

b. an outlet end in communication with the inlet of the screw extruder for delivering the preheated thermoplastic bulk material thereinto,

c. slideway means between the delivery and outlet ends, the slideway means being composed of a succession of axially aligned, superposed trays arranged in series, each of the trays having an annular bottom constituting a slideway, each tray bottom having an eccentric port and the eccentric ports in successive ones of the tray bottoms being angularly offset in relation to the ports in the adjacent tray bottoms,

d. a star wheel coaxial with the trays and associated with each of the trays, each star wheel including a set of angularly spaced scraper flights in scraping contact with the annular slideway bottom of the associated tray, adjacent ones of the scraper flights defining cells,

e. a drive shaft coaxially extending through the tray bottoms, each of the star wheels being keyed to the drive shaft and the drive shaft being mounted for rotation with respect to the tray bottoms,

f. means for rotating the drive shaft at a controlled speed to sweep the scraper flights along the tray bottoms whereby the thermoplastic bulk material received through the delivery end is pushed in discrete portions in said cells along the bottom of a first one of the trays, gravity fed through the port in said tray into a respective one of the cells associated with the next lower one of the trays whence the discrete portions are gravity fed through the ports in the succession of trays to the outlet end,

g. means for controlling the delivery rate of the thermoplastic bulk material to the delivery end, and

h. heating means associated with each of the tray bottoms and controllable to determine the heating temperature for each tray bottom.

4,059,402

TRANSFER PRINTING PROCESS

Gerhard Wolfrum, Bergisch-Neukirchen; Werner Kühnel, Leverkusen; Erich Klauke, Odenthal-Hahnenberg, and Gerhard Büttner, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

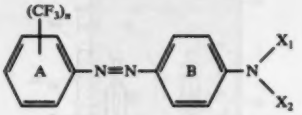
Continuation of Ser. No. 533,307, Dec. 16, 1974, abandoned. This application June 1, 1976, Ser. No. 691,869

Claims priority, application Germany, Dec. 24, 1973, 2364475

Int. Cl.[2] D06P *5/20, 5/17*

U.S. Cl. 8—2.5 A 8 Claims

1. In a process for printing hydrophobic fiber materials selected from the group consisting of polyesters and polyamides by the sublimation transfer printing process, the improvement which comprises employing sublimable azo dyestuffs which have the formula



wherein X_1 and X_2 are hydrogen, C_1–C_4-alkyl, C_5–C_7-cycloalkyl, substituted C_1–C_4 -alkyl, or substituted C_5–C_7-cycloalkyl, wherein the substituents are C_1–C_2-alkoxy, halogen, or phenyl;

n is a number from 1 to 3;

A is substituted as shown in the above formula or is further substituted by NO_2, CN, halogen, SO_2CH_3, $SO_2C_2H_5$, C_1–C_4-alkyl, or C_1–C_4-alkoxy; and

B is as shown in the formula or is further substituted by C_1–C_4-alkyl, C_1–C_4-alkoxy, halogen, benzyloxy, phenoxy, C_1–C_4-alkylcarbonylamino, formylamino, halo, (C_1–C_4-alkyl) carbonylamino, or haloformylamino.

4,059,403

PROCESS FOR DYEING WET-SPUN AROMATIC POLYAMIDES IN GEL FORM

Gerhard Dieter Wolf; Ralf Miessen; Hans Egon Künzel, all of Dormagen, and Francis Bentz, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Aug. 7, 1975, Ser. No. 602,783

Claims priority, application Germany, Aug. 10, 1974, 2438544

Int. Cl.[2] D06P *5/00, 3/24*

U.S. Cl. 8—168 B 13 Claims

1. A process for the production of dyed filaments of aromatic polyamides which comprises continuously dyeing wet-spun gel filaments of an aromatic polyamide which contains acidic groups before, during, or after stretching, in an aqueous bath containing at least one water-soluble, cationic dye in dissolved form.

4,059,404

SWAB AND METHOD OF TAKING CELL SMEARS FOR DIAGNOSTIC EXAMINATION

Wilhelm Schuster, Frankfurt am Main, and Gert Schüluter, Liederbach, Taunus, both of Germany, assignors to Battelle-Institute e.V., Frankfurt am Main, Germany

Filed Mar. 29, 1976, Ser. No. 671,369

Claims priority, application Germany, Mar. 29, 1975, 2513941

Int. Cl.[2] C12K *1/10;* A61B *10/00*

U.S. Cl. 23—230 B 7 Claims

1. A method of taking cell smears for diagnostic examination comprising the steps of:

a. collecting a cellular specimen of or from the skin, mucous membrane or other body area or surface to be examined by means of a swab located on applicator;

b. dissolving said swab in a solvent that has no detrimental effect on the collected cellular material in the speimen

whereby a solution is formed containing said cellular material; and

c. diagnostically examining said cellular material.

4,059,405

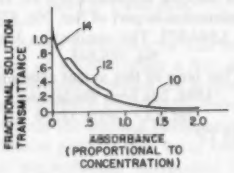
METHOD AND APPARATUS FOR ANALYSIS OF CONSTITUENT CARRIED IN FIBROUS MEDIUM

Lester A. Sodickson, Newton, Mass., and Franklin Lim, Richmond, Va., assignors to Damon Corporation, Needham Heights, Mass.

Continuation-in-part of Ser. No. 243,068, April 11, 1972, abandoned, and a continuation-in-part of Ser. No. 498,646, Aug. 19, 1974, abandoned. This application Aug. 19, 1976, Ser. No. 715,855

Int. Cl.[2] G01N *21/24, 33/16*

U.S. Cl. 23—230 R 36 Claims



1. In the constituents analysis of sample material on a porous medium by reaction in a liquid state with reactants to produce a constituent-manifesting reaction product, the improvement comprising the steps of

A. producing said reaction product at said analysis site with only an optically-thin concentration,

B. illuminating said analysis site with incident electromagnetic radiation,

C. sensing, from a field of view coincident with said analysis site, electromagnetic radiation that is resultant from said incident radiation and responsive to both the background response of said medium to said illumination and the concentration of said reaction product, and

D. producing a sample-measuring signal in response to a differential function of said product-responsive sensed radiation and radiation resultant from incident radiation on said field of view and responsive to said background response of said medium at said analysis site and to said sample material and said reagents prior to said product-producing reaction.

4,059,406

ELECTROCHEMICAL DETECTOR SYSTEM

Bernard Fleet, London, England, assignor to E D T Supplies Limited, London, England

Filed July 12, 1976, Ser. No. 704,299

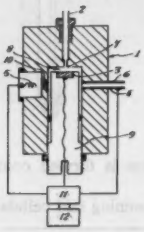
Int. Cl.[2] G01N *27/26, 27/30, 31/08*

U.S. Cl. 23—230 R 18 Claims

1. A method for detecting an electroactive species in a flow stream comprising the steps of:

i. forcing a solution containing the electroactive species through a fine nozzle to form a jet,

ii. impringing the jet normally to a surface of a sensor electrode so that the solution spreads radially over the surface in a thin film,



iii. applying a periodically changing voltage to the sensor electrode, so that one part of each cycle of the applied voltage functions as a detecting potential and another part of each cycle functions as a cleaning potential, and

iv. measuring a current at the sensor electrode during that part of each cycle of the applied voltage functioning as a detecting potential.

4,059,407

DISPOSABLE CHEMICAL INDICATORS

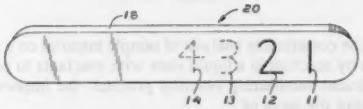
Harry T. Hochstrasser, Hastings-on-Hudson, N.Y., assignor to Becton, Dickinson and Company, Rutherford, N.J.

Continuation of Ser. No. 676,662, April 14, 1976, abandoned, which is a continuation-in-part of Ser. No. 533,972, Dec. 18, 1974, Pat. No. 3,964,871. This application Jan. 12, 1977, Ser. No. 758,646

The portion of the term of this patent subsequent to June 22, 1993, has been disclaimed.

Int. Cl.[2] G01N *33/16*

U.S. Cl. 23—253 TP **9 Claims**



1. An indicator for the measurement of ketones dissolved in biological fluids, which comprises;

a support member; and

a plurality of indicating reagents for said ketones, each of which is located in a separate zone of said member and at least two of which indicate the presence of a different concentration of said ketones in solution.

4,059,408

AUTOMATIC LIQUID-LIQUID EXTRACTION DEVICE

Gilbert Boisde, Bures sur Yvette, and Alain Richerot, Bagneux, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Mar. 3, 1977, Ser. No. 774,126

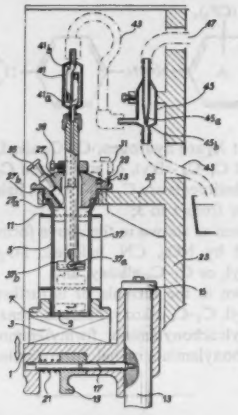
Claims priority, application France, Mar. 12, 1976, 76.07189

Int. Cl.[2] B01D *11/04*

U.S. Cl. 23—267 R **7 Claims**

1. An automatic liquid-liquid extraction device comprising at least one extraction vessel equipped with agitation means, liquid-withdrawal means associated with said vessel and means for supporting said vessel or vessels and said liquid-withdrawal means, wherein said liquid-withdrawal means consist of a substantially vertical suction duct whose upper end is connected to a discharge pipe fitted with pneumatic pressure-reducing means and whose lower end is connected to a plurality of nozzles which open into the liquid of said vessel in the same horizontal plane at the periphery of said vessel, said withdrawal means being further provided with a leak-tight chamber connected at one end to said suction duct and at the other end to said discharge pipe, the level at which said duct opens into said chamber being higher than the level at which said pipe opens into said chamber said pneumatic pressure-reducing means being constituted by a Venturi tube so arranged that the ejector-nozzle of said tube has its opening at the level of the discharge pipe at the outlet of said Venturi tube, said means for supporting said vessel or vessels and the means for supporting said liquid-withdrawal means being constituted respectively by:

a movable platform which also supports said agitation means. said platform being capable of vertical motion between a bottom position and a top position, and by



a fixed structure for additionally supporting closure means for said vessel or vessels; said platform and said structure being arranged respectively and positioned with respect to each other in such a manner as to ensure that, in the top position of said platform, each vessel is fitted with closure means and associated with liquid-withdrawal means and that, in the bottom position of said platform, each vessel is disengaged from said closure means and from said liquid-withdrawal means so as to permit loading and unloading of said vessel, said closure means consisting of a plug freely mounted in translational motion on the suction duct of the liquid-withdrawal means associated with said vessel or vessels.

4,059,409

APPARATUS FOR ELIMINATING AMMONIA FUMES EMANATING FROM DIAZO COPIERS

Robert M. Barto, Wyckoff, and Loren E. Shelffo, S. Orange, both of N.J., assignors to Blu-Ray, Incorporated, Essex, Conn.

Filed Mar. 12, 1976, Ser. No. 666,314

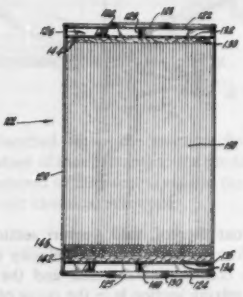
Int. Cl.[2] B01D *53/34;* B01J *8/04;* C01C *1/12;* G03D *7/00*

U.S. Cl. 23—284 **26 Claims**

1. Apparatus for eliminating noxious fumes emanating from equipment used for the development of sheetlike prints, such equipment having means to develop said prints including a developing tank, a guide surface extending outwardly from said developing tank along which such prints are expelled from the equipment, and a wall member spaced a predetermined distance from said guide surface to form an elongated output aperture for said prints, said apparatus including

an enclosure attached to said wall of said equipment so that it extends along and partially covers said output aperture, said enclosure including a first and second members each of which has at least one elongated side, and a first and

second transverse ends, said first member having a portion which is spaced from said second wall of said equipment and extends toward said guide surface terminating in said one elongated longitudinal side of said first member which is adjacent to, but spaced from, said guide surface at a line spaced along said guide surface from said output aperture to form a first output slot, said first member having an aperture formed in said extending portion adjacent to said first end, and said second member extending substantially across said output aperture and terminating in said elongated longitudinal side of said second member which is adjacent to, but spaced from, said guide surface to form a



second output slot, at least one end piece, said end piece being connected between the first transverse ends of said first and second members, and an elongated flexible member attached along said longitudinal side of said first member and extending across said first output slot to contact said guide surface;

a filter assembly including a filter body which is adapted to absorb said noxious fumes from air passing therethrough;

coupling means connected between said aperture in said first wall member and said filter means; and

suction means adapted to draw air from said enclosure through said coupling means and said filter means.

4,059,410

METHOD FOR THE PREPARATION OF NONCAKING COALS FROM CAKING COALS BY MEANS OF ELECTROPHILIC AROMATIC SUBSTITUTION

Richard H. Schlosberg, New Providence; Martin L. Gorbaty, Fanwood, both of N.J., and Robert J. Lang, Baytown, Tex., assignors to Exxon Research & Engineering Co., Linden, N.J.

Filed June 28, 1976, Ser. No. 700,104

Int. Cl.² C10L *9/02*

U.S. Cl. 44—1 R **15 Claims**

1. A process for the preparation of noncaking coal from caking coal which comprises the step of electrophilically aromatically substituting the caking coal yielding a product thereby which is a noncaking coal.

2. The process according to claim 1 wherein the electrophilic aromatic substitution reaction practiced on the coal comprises alkylation.

6. The process of claim 1 wherein the electrophilic aromatic substitution reaction step practiced on the coal is conducted in the presence of a catalyst.

4,059,411

METHOD FOR EXTENDING THE LOWER LEAN LIMIT OF RUNNING OF INTERNAL COMBUSTION ENGINES AND IMPROVING THE COMBUSTION OF FLUID FUELS

Marvin M. Smith, 1010 E. Parkway Drive, Muncie, Ind. 47304

Continuation-in-part of Ser. No. 605,534, Dec. 20, 1966, abandoned, Ser. No. 89,048, Nov. 12, 1970, abandoned, Ser. No. 289,973, Sept. 18, 1972, abandoned, Ser. No. 469,612, May 13, 1974, abandoned, and Ser. No. 545,730, Jan. 30, 1975, abandoned. This application Apr. 2, 1976, Ser. No. 673,293

Int. Cl.² C10L *1/32*

U.S. Cl. 44—51 **3 Claims**

1. A fuel composition for lowering the lean limit of stable combustion of a combustible fuel and air mixture comprising a liquid hydrocarbon fuel having dispersed therein a quantity of discrete particulates of a size of about 10 to 40 microns substantially equivalent in number to the number of similarly sized polyvinyl alcohol particles which would equal in weight about 6% of the weight of a mixture of the said polyvinyl alcohol particles and the said liquid hydrocarbon fuel.

4,059,412

METHOD FOR PRODUCING FUEL BRIQUETTES

Walter Goossens; Wolfgang Hermann, both of Wuerselen-Bardenberg; Wilhelm Keusch, Baesweiler, and Rudolf Redlich, Herzogenrath, all of Germany, assignors to Eschweiler Bergwerks-Verein Aktiengesellschaft, Herzogenrath-Kohlscheid, Germany

Filed June 3, 1976, Ser. No. 692,376

Claims priority, application Germany, June 4, 1975, 2524692

Int. Cl.² C10L *5/00*

U.S. Cl. 44—10 H **2 Claims**

1. A method for the production of fuel briquettes by hot pressing a mixture of a coal having a fine grain size which softens at the temperature at which the briquettes are pressed and of a component which is substantially undeformable at said temperature, wherein the starting components are heated to different temperatures prior to their being intermixed, by first introducing the non-softening component into a hot gas stream, as viewed in the flow direction, and then introducing the softening component into the hot gas stream, from which they are separated after heating, characterized in that pure oxygen or an oxygen/nitrogen mixture including more than 21% by volume of oxygen is used in such a manner as a process regulating medium and as a reaction component of a heat-up medium, preferrably in a ratio of 2:1 up to the stoichiometric ratio, and wherein a carrier gas stream, having temperatures between 1000° C to 1700° C, is produced in such a manner, that adjusted to the type of starting components which are present in grain sizes up to 14mm, granular structures are achieved which result in bulk weights of between 0.3t/m³ to 0.7t/m³ prior to the intermixing, at average or mean heat-up speeds of about 2500° C/sec and end temperatures of between 350° C to 700° C of the substantially undeformable component.

4,059,413

WINDOW SECURITY APPARATUS

Joseph Forgione, 6145 Highway 51 North, Millington, Tenn. 38053

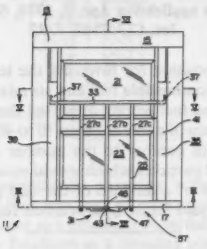
Filed June 4, 1976, Ser. No. 693,214

Int. Cl.² E06B *3/68*

U.S. Cl. 49—56 **10 Claims**

5. Window security apparatus for attachment to the interior side of conventional window structure, said window security apparatus comprising guard means including a horizontally disposed bar member and a plurality of rigid, one-piece vertically disposed bar members having the respective upper ends thereof fixedly attached to said horizontally disposed bar member, the sill element of said window structure being provided with a plurality of apertures for respectively slidably receiving said plurality of vertically disposed bar members, track means

fixedly attached to the casing elements of the window structure for engaging and guidingly constraining said horizontally disposed bar member, said track means being separate from the tracks of the window structure that engage and guidingly constrain the sash members of the window structure, said guard means being free to be slidably moved between an up, window occluded position and a down, window unobstructed position independently from either of the sash members of the window structure lock means positioned beneath one of said



vertical bar members of said guard means and having locked and unlocked positions for selectively supporting the entire weight of said guard means to preclude downward movement of said guard means when said guard means is in said up, window occluded position and said lock means is in said locked position and for enabling said guard means to be moved up and down when said lock means is in said unlocked position, and lock trip-release means for remotely actuating said lock means between said locked and unlocked positions.

4,059,414

ASHLESS FUEL DETERGENT ADDITIVES

Hans D. Holtz, and Benedict R. Bonazza, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed May 28, 1976, Ser. No. 691,118
Int. Cl.[2] C10L *1/24*
U.S. Cl. 44—58 **4 Claims**

1. A method for reducing engine deposits in an internal combustion engine comprising the addition to the hydrocarbon fuel for the engine of a detergent fuel additive prepared by reacting (a) a sulfonic acid represented by the formula $R''SO_3H$ where R'' is alkyl or alkylaryl having 6–80 carbon atoms in the molecule with (b) the product of the reaction of (1) a long chain monocarboxylic acid having the general formula R'COOH in which R' is a straight or branched chain alkyl or arylalkyl radical having 10–30 carbon atoms and (2) a trialkanolamine represented by the generic formula $N(R—OH)_3$ wherein R is an alkylene radical having 2–10 carbon atoms, said ashless fuel detergent being added in an amount effective to reduce engine deposits and using said hydrocarbon fuel with ashless fuel detergent additive as fuel in an internal combustion engine.

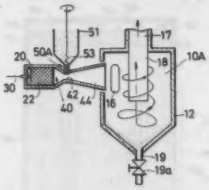
4,059,415

APPARATUS FOR REFORMING COMBUSTIBLE INTO GASEOUS FUEL BY REACTION WITH DECOMPOSITION PRODUCT OF HYDROGEN PEROXIDE

Katuaki Kosaka, Hidaka; Fumio Wagatsuma, Tokyo; Mithuo Shimomoto, Sayama; Osamu Harada, Kawagoe, and Zene Ueno, Fuchu, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed May 27, 1976, Ser. No. 690,791
Claims priority, application Japan, May 28, 1975, 50-63037
Int. Cl.[2] B01J *7/00*; C10J *3/50*; F02B *43/08*; F02C *3/26*
U.S. Cl. 48—63 **3 Claims**

1. In an apparatus for carrying out the reforming of a combustible material into a gaseous fuel containing as combustible components at least one of hydrogen and carbon monoxide by reaction of the combustible material with a heated mixture of oxygen and steam prepared by the decomposition of hydrogen peroxide, the apparatus including a reaction chamber to carry out a reforming reaction, a catalytic reactor to decompose hydrogen peroxide into a heated mixture of oxygen and steam, a fluid passage connecting the reactor to the reaction chamber and a circuit for feeding the combustible material to the reaction chamber, the improvement comprising a venturi section formed in the fluid passage and a mixing section formed in the fluid passage adjacent and downstream of the constricted throat of said venturi section, the combustible material feed circuit opening into said venturi section substantially at the



constricted throat thereof, said venturi section and mixing section being formed such that the velocity of a flow of a mixture of the combustible material and the oxygen-steam mixture in said mixing section is in the range of from 10m/sec to the velocity of sound, said combustible material feed circuit comprising a screw conveyor adapted to transfer a solid combustible in the form of fine particles, the reaction chamber being in the form of a cyclone, the fluid passage being arranged such that the mixture of the combustible material and the oxygen-steam mixture is introduced into the reaction chamber generally in a tangential direction; whereby the oxygen steam mixture and the combustible material are rapidly and uniformly mixed with each other prior to the admission into the reaction chamber.

4,059,416

CHEMICAL REACTION PROCESS UTILIZING FLUID-WALL REACTORS

Edwin Matovich, Brea, Calif., assignor to Thagard Technology Company, Irvine, Calif.

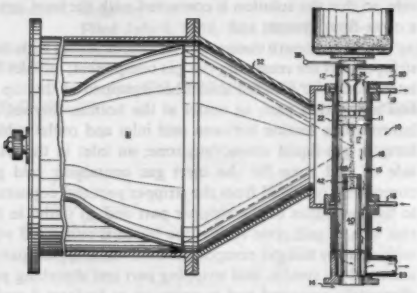
Continuation-in-part of Ser. No. 271,560, July 13, 1972, Pat. No. 3,933,434, and a continuation-in-part of Ser. No. 591,949, June 30, 1975, and a continuation-in-part of Ser. No. 591,950, June 30, 1975, and a continuation-in-part of Ser. No. 606,222, Aug. 20, 1975, and a continuation-in-part of Ser. No. 616,393, Sept. 24, 1975, and a continuation-in-part of Ser. No. 631,912, Nov. 14, 1975. This application Jan. 19, 1976, Ser. No. 649,971
Int. Cl.[2] C10J *3/00*
U.S. Cl. 48—197 R **25 Claims**

1. A high temperature chemical reaction process which comprises:

a. generating an annular envelope of an inert fluid which is substantially transparent to radiation within a shell of a refractory material which reflects radiation; the volume enclosed by the shell constituting a black body cavity, the envelope having substantial axial length and the interior of the envelope defining a reaction chamber;

b. introducing a first group of reactants and a second group of reactants into the black body cavity and into the reaction chamber, at least one of the first group of reactants and at least one of the second group of reactants being directed along a predetermined path substantially coincident with the longitudinal axis of the envelope, the first group of reactants being capable of reacting endothermically at a predetermined temperature and the second group being capable of reacting exothermically at the predetermined temperature; and

c. directing high intensity radiant energy into the reaction chamber to coincide with at least a portion of the predetermined path of the reactants, sufficient radiant energy



being absorbed within the reaction chamber to raise the temperature of the reactants to the predetermined temperature required to initiate and sustain the endothermic and exothermic chemical reactions.

4,059,417

METHOD FOR PRODUCING ALUMINA AND ALUMINA-ZIRCONIA ABRASIVE MATERIAL

Bernard Ilmaier, Treibach, and Hans Zeiringer, Kappel, Krapfeld, both of Austria, assignors to Treibacher Chemische Werke Aktiengesellschaft, Treibach, Austria

Division of Ser. No. 579,555, May 21, 1975, abandoned. This application June 10, 1976, Ser. No. 694,993

Claims priority, application Austria, May 29, 1974, 4420/74; May 29, 1974, 4423/74; June 25, 1974, 5276/74

Int. Cl.[2] C04B *31/16;* B24D *3/04*

U.S. Cl. 51—309 A 18 Claims

1. A method for producing abrasive granules on the basis of an oxide material selected from the group consisting of alumina and a mixture thereof with zirconia, wherein the oxide material is melted and the melt is rapidly cooled, comprising the steps of casting the melt into a molten salt selected from the group consisting of NaCl, $CaCl_2$, $BaCl_2$, $MgCl_2$ and mixtures thereof to cool the oxide material melt, separating the salt from the cooled and solidified oxide material, and thereafter producing abrasive granules from the solidified oxide material.

4,059,418

FLUE GAS DESULFURIZATION SORBENT AND PROCESS

Neville L. Cull, Baker, La., assignor to Exxon Research & Engineering Co., Linden, N.J.

Continuation of Ser. No. 390,919, Aug. 23, 1973, abandoned. This application Mar. 17, 1975, Ser. No. 559,010

Int. Cl.[2] B01D *53/02*

U.S. Cl. 55—73 14 Claims

1. In a process wherein sulfur dioxide is separated from a gaseous mixture containing the same by contacting said gaseous mixture, under desulfurization conditions, with a solid sorbent comprising a carrier and an active material supported thereon, which active material will selectively react with sulfur dioxide at the desulfurization conditions employed, the improvement wherein said carrier comprises a low surface area substrate coated with an adherent refractory oxide film.

4,059,419

VORTEX NUCLEATION SCRUBBING METHOD AND APPARATUS

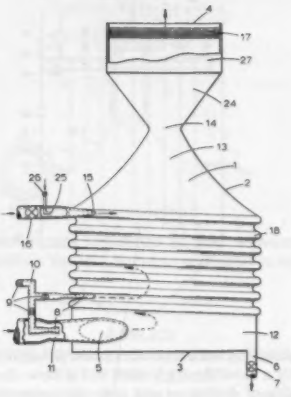
Leon Irving Ross, P.O. Box 514, Grand Cayman, British W. Indies

Continuation-in-part of Ser. No. 398,587, Sept. 18, 1973, abandoned. This application July 11, 1975, Ser. No. 595,004

Claims priority, application United Kingdom, Oct. 2, 1972, 45266/72; Canada, Mar. 5, 1974, 181061

Int. Cl.[2] B01D *47/00*

U.S. Cl. 55—92 13 Claims

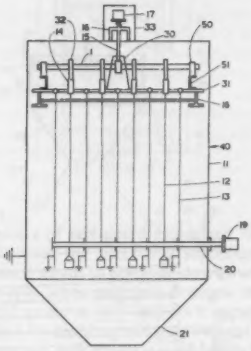


1. A process for separating particles suspended in a gas stream from the gaseous phase, at least some of the particles being too small to be centrifugally separated, the process comprising introducing a suspended particle-containing gas into an elongate vessel of generally circular internal cross-section, at a location adjacent the lower end of the vessel; introducing a scrubbing liquid at a location adjacent the upper end of said vessel; introducing scrubbing liquid vapor into the vessel whereby the gas and liquid move axially counter-currently through the vessel; spinning the gas and vapor within the vessel at a rotational velocity sufficient to create a vortex having a radial temperature gradient therethrough, the temperature decreasing radially inwardly of the vortex, as the gas adiabatically expands due to the tangential velocity; maintaining the temperature of the gas adjacent the outer periphery of the vortex sufficiently high to cause at least part of the scrubbing liquid to evaporate in an outer zone of the vortex, the radial temperature gradient being sufficient to cool the gas and vapor to the dew point of the vapor at a radius intermediate the outer periphery and longitudinal axis of the vortex, such that at least part of the resultant vapor is caused to condense upon some of the suspended particles at such relatively colder intermediate radius of the vortex, thus forming larger wetter particles; the larger wetted particles passing radially outwardly towards the warmer outer periphery of the vortex, where further condensation does not occur; and separately removing such larger wetted particles as the outer periphery of the vortex from the gaseous phase; wherein the suspended particles located between the aforesaid intermediate radius and the longitudinal axis of the vortex continue to be wetted by additional condensing vapor within the vortex until they are sufficiently heavy to be centrifugally separated from the gas stream by being spun outwardly towards the peripheral warmer portion of the gas vortex, from which they are removed.

4,059,420
BEARINGS AND RAPPING SHAFT IN ELECTROSTATIC PRECIPITATOR

Alfred Frauenfelder, Zollikerberg, and Xaver Johann Huppi, Zurich, both of Switzerland, assignors to Elex A.G., Zurich, Switzerland

Continuation-in-part of Ser. No. 580,203, May 23, 1975, Pat. No. 3,958,844. This application Feb. 2, 1976, Ser. No. 654,088
The portion of the term of this patent subsequent to May 25, 1993, has been disclaimed.
Int. Cl.² B03C *3/76*
U.S. Cl. 55—112 **7 Claims**

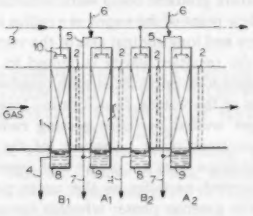


1. In combination with an electrostatic precipitator having a housing with a flow through inlet and a flow through outlet and a plurality of discharge and collecting electrodes therein, said housing including an opening therein with a rapping shaft extending therethrough, said rapping shaft being in communication with rapping means for said electrodes, a bearing assembly for said rapping shaft comprising: two spaced bearings each supported by an elongated rod member mounted in spaced relation in slots open at the top extendng downwardly into a bearing block, the rapping shaft including a wear ring on the outer periphery thereof, the wear ring being detachably mounted to said shaft and disposed in contacting relationship with said bearings.

4,059,421
CROSS-FLOW TYPE STRIPPING-ABSORPTION APPARATUS

Shigehiro Kurata, Ichinomiya, and Kenzo Abe, Ohtaki, both of Japan, assignors to United Resources Industry Co., Ltd., Tokyo, Japan

Filed June 25, 1976, Ser. No. 699,806
Claims priority, application Japan, Sept. 2, 1975, 50-105656
Int. Cl.² B01D *53/14*
U.S. Cl. 55—196 **4 Claims**



1. A multi-stage cross-flow type stripping-absorption apparatus for recovery of at least one gas component from a solution containing said gas component which comprises (I) two or more of stripping-absorption units consisting of

a. a stripping part for removing the gas component; an inlet for the solution equipped at the top of said stripping part; an outlet at the bottom of said stripper part; an intermediate section between said inlet and outlet which forms a gas-liquid contacting zone; an inlet for an inert gas provided in the front side of said zone and an outlet in the rear side, so that the solution is contacted with the inert gas in a cross-flow system, and

b. an absorption part connected to and in series with said stripper part for removing the gas component; an inlet for introduction of a liquid absorbent equipped at the top of said absorption part; an outlet at the bottom thereof; an intermediate section between said inlet and outlet which forms a gas-liquid contacting zone; an inlet in the front side of said zone for the inert gas containing said gas component removed from the stripper part and connected to the gas outlet of the stripper part and an outlet in the rear side of said zone so that the liquid is contacted with said inert gas and gas component from the stripping part in a cross-flow system, said stripping part and absorbing part alternately arranged and in series so as to form a multi-stage system;

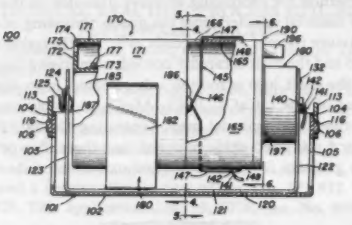
II. at least one blower for circulating the inert gas from the first unit to the following units in turn, and then finally again to said first unit, which blower is placed in a duct as defined in (III) below, and

III. a horizontal duct for connecting the units (I) and the blower (II) arranged in series in the direction of the inert gas, to form a closed circuit system such that the inert gas may be recirculated throughout the apparatus after the gas component is removed therefrom by contact with liquid absorbent in the absorption parts of unit (I).

4,059,422
DISPENSER FOR ODOR CONTROL AGENT

Robert L. Steiner, Chicago, Ill., assignor to Steiner American Corporation, Salt Lake City, Utah

Filed June 21, 1976, Ser. No. 697,867
Int. Cl.² B01D *53/04*
U.S. Cl. 55—418 **14 Claims**



1. A dispenser for odor control agents comprising a housing having air intake openings and air discharge openings therein and including a base, a fan mounted on said base for drawing air through said air intake openings to establish an air stream through said housing, a cartridge removably mounted on said base and including a compartment for receiving an odor control agent therein, duct means for directing the air stream of said fan through said compartment past the odor control agent therein and out through the air discharge openings, and a cover for said base shiftably mounted with respect thereto for movement while mounted between a closed operating position and an open servicing position, said cover in the closed position thereof cooperating with said base to enclose said fan and said cartridge, said cover in the open position thereof rendering said fan and said cartridge accessible for removal and replacement and servicing, said housing and said fan and said cartridge being constructed and arranged so that the dispenser is operable in all orientations of said housing.

4,059,423

PROCESS FOR THE PREPARATION OF EXPANSIBLE BEADS

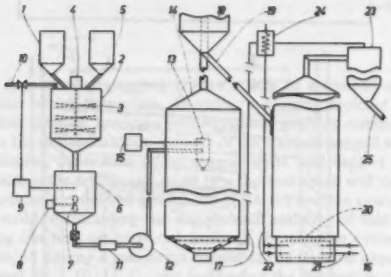
Daniel De Vos, Jette; Paul-Marie Michel, Jumet, and Alfred Berger, Jamiouix, all of Belgium, assignors to Sovitec S.A., Charleroi, Belgium

Filed July 1, 1976, Ser. No. 701,966

Claims priority, application United Kingdom, July 17, 1975, 30089/75

Int. Cl.[2] C03B *19/08, 19/10*

U.S. Cl. 65—21 23 Claims



1. A process for the preparation of expansible beads which are convertible by firing into cellular glass bodies, said process comprising the steps of:

preparing a slip having a liquid medium continuous phase and a disperse phase, said slip containing particles of glass or glass-forming material, a cellulating agent, and a binder, the disperse phase of said slip including at least most of said particles,

dividing said slip into drops, said slip which is divided into drops having a viscosity in the range 200 to 10,000 cp, and

subjecting said drops while in divided condition to a heat treatment including heating and cooling stages so as to cause evaporation of liquid from said drops and conversion thereof into self-sustaining beads in which said glass or glass-forming particles are held together by said binder and which contain said cellulating agent or gas derived therefrom.

4,059,424

APPARATUS FOR THE CONTROLLED SUPPLY OF CRYOGENIC FLUID

Gerard Bentz, Elancourt-Trappes, France, assignor to L'air Liquide, Societe Anonyme pour l'etude et l'exploitation des Procedes Georges Claude, Paris, France

Filed Feb. 10, 1976, Ser. No. 656,968

Claims priority, application France, Feb. 25, 1975, 75.05734

Int. Cl.[2] F17C *7/02*

U.S. Cl. 62—49 14 Claims

1. Apparatus for delivering the liquid phase of a cryogenic fluid to a point open to free air at which it is to be used, said apparatus comprising in combination:

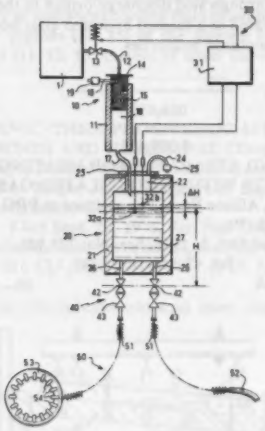
a. a tank in which said cryogenic fluid is stored under pressure;

b. a phase-separator having an infeed duct connected to said tank to allow said fluid, which is delivered in the form of a two-phase mixture, to pass to said separator, and discharge means to allow the liquid phase of said mixture to flow out by gravity, said infeed duct being provided with a member for regulating throughput which can be remotely actuated;

c. a liquid-collecting container which is fed by said discharge means and having outlet means to allow the body of liquid collected in said container to flow out by gravity;

d. a system to control said throughput regulating member which is sensitive to the level of liquid in said container and which is provided to maintain said level constant;

e. adjustable-throughput withdrawal means which are connected to said outlet means from said containers; and



f. distributor means connected to said withdrawal means which deliver the said liquid to said point at which it is to be used.

4,059,425

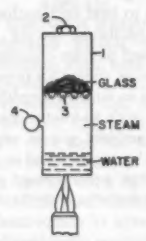
GASEOUS PROCESS FOR HYDRATING AND EXTRUDING GLASS

William T. Brydges, III, and Edwin J. Illig, both of Corning, N.Y., assignors to Corning Glass Works, Corning, N.Y.

Continuation of Ser. No. 542,233, Jan. 20, 1975, abandoned. This application Apr. 21, 1976, Ser. No. 678,930

Int. Cl.[2] C03C *19/00, 15/00;* C03B *31/00;* C01B *33/32*

U.S. Cl. 65—22 1 Claim



1. A process for combining hydrating and extruding Na_2O and/or K_2O-SiO_2 glass materials which consists of the steps:

a. forming anhydrous glass bodies having thickness dimensions not exceeding about 15 mm. and consisting essentially, in mole percent on the oxide basis, of about 3–25% Na_2O and/or K_2O and 50–95% SiO_2, the sum of those components constituting at least 55% of the total composition;

b. placing said anhydrous glass bodies within a chamber capable of withstanding a gaseous H_2O-containing environment at elevated temperatures and pressures and having at least one discharge orifice;

c. contacting said anhydrous glass bodies within said chamber with a gaseous H_2O-containing environment having a relative humidity of at least 5% at a temperature greater than 100° C. for a time and at a steam pressure sufficient

I. to hydrate at least a surface portion on said glass bodies to thereby cause an amount of water to be absorbed therein effective to impart thermoplastic properties

thereto and cause said hydrated glass bodies to coalesce together; and thereafter

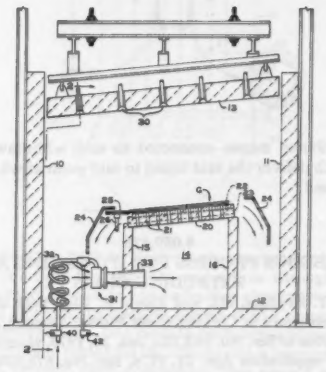
II. to extrude said hydrated coalesced glass under steam pressure through said discharge orifice in the form of a solid hydrated or a foamed hydrated glass body exhibiting thermoplastic properties.

4,059,426

METHOD AND APPARATUS FOR HEATING GLASS SHEETS WITH RECIRCULATED GAS

Eugene W. Starr, Allison Park, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Oct. 1, 1976, Ser. No. 728,829
Int. Cl.[2] C03B *29/00*
U.S. Cl. 65—25 A 11 Claims



1. A furnace for heating a sheet of glass while supporting on a layer of gas comprising:

an enclosure, means to heat said enclosure, a glass support bed within said enclosure having gas passages therethrough, an enclosed plenum chamber in communication with said gas passages, means for pressurizing said plenum chamber including an air flow amplifier having a conduit-like configuration with an inlet throat at one end in communication with ambient gas in said enclosure and an outlet opening at the opposite end in communication with said plenum chamber, a compressed gas tube connected at one end to a side inlet of said air flow amplifier and at the other end to a source of compressed gas outside of said enclosure, and a narrow, peripherally extending opening adjacent to the inside surface of said inlet throat communicating with the compressed gas inlet and adapted to direct a high velocity stream of gas along the interior surface of said inlet throat, whereby ambient gases in said enclosure are drawn into said plenum and forced through said passages in said support bed with sufficient pressure to establish gas support for a sheet of glass overlying said bed.

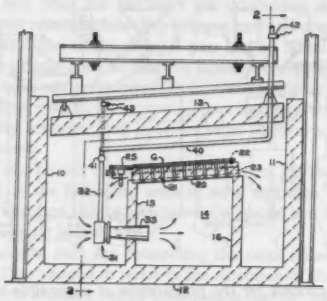
6. A method of heating a sheet of glass while supporting on a layer of gas comprising transporting a sheet of glass into an enclosure and into a position overlying a support bed having gas passages communicating with a plenum chamber therebelow, heating the gases within the enclosure, establishing an annular flow from a source of compressed gas in a Coanda effect air flow amplifier within the enclosure thereby drawing heated ambient gas from the enclosure into the air flow amplifier and discharging the gas into the plenum chamber so as to pressurize the plenum chamber and force gas through the support bed passages with sufficient pressure to support the sheet of glass on the gas.

4,059,427

ELECTRIC GLASS SHEET HEATING FURNACE AND METHOD OF USING

Eugene W. Starr, Allison Park, and George W. Misson, Franklin Township, Butler County, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Oct. 1, 1976, Ser. No. 728,808
Int. Cl.[2] C03B *29/00*
U.S. Cl. 65—25 A 9 Claims



1. A furnace for heating sheets of glass while supported on a layer of gas comprising:

an enclosure, a glass support bed within said enclosure having gas passages therethrough, an enclosed plenum chamber in communication with said gas passages, means for pressurizing said plenum chamber including gas entrainment means having an inlet throat in communication with ambient gas in said enclosure and an outlet opening in communication with said plenum chamber, an electrically conductive tube heater for carrying compressed gas communicating at one end with said gas entrainment means and at the other end to a source of compressed gas outside of said enclosure, whereby ambient gases in the enclosure are drawn into the plenum and forced through said passages in the support bed with sufficient pressure to establish gas support for a sheet of glass on the bed, an intermediate portion of said tube overlying the glass support bed in generally parallel, closely spaced relation thereto, and electric circuit means connected to said tube heater for passing current along and heating said intermediate portion of said tube heater, whereby the compressed gas and the glass sheets are heated by means of electric energy applied to said tube heater.

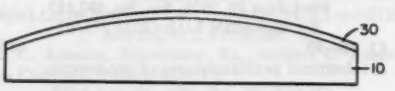
6. A method of heating a sheet of glass while supported on a layer of gas comprising transporting a sheet of glass into an enclosure and into a position overlying a support bed having gas passages communicating with a plenum chamber therebelow, establishing an entrained gaseous flow from a source of compressed gas with gas entrainment means within the enclosure thereby drawing ambient gas from the enclosure into the gas entrainment means and discharging the ambient gas into the plenum chamber so as to pressurize the plenum chamber and force gas through the support bed passages with sufficient pressure to support the sheet of glass on the gas, passing the incoming stream of compressed gas being fed to the gas entrainment means through a tube heater overlying the path of glass travel through the enclosure in closely spaced, generally parallel relation thereto, passing electric current through the tube heater to heat the compressed gas passing through the tube heater and the glass passing beneath the tube.

4,059,428

METHOD OF FORMING SAGGING MOLD FROM A GLASS CERAMIC

Wendell C. Andrews, Mesa, Ariz., assignor to Corning Glass Works, Corning, N.Y.

Filed Feb. 20, 1976, Ser. No. 659,698
Int. Cl.[2] C03B *23/02*
U.S. Cl. 65—33 6 Claims



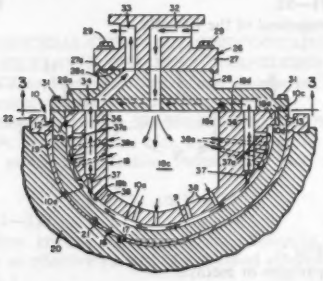
6. A method of sagging a glass article to a desired surface contour which comprises, providing a sagging mold of glass-ceramic material having a predetermined contour corresponding to the desired surface contour of the finished sagged article, positioning the article to be sagged upon said sagged mold, subjecting the article and mold to a thermal cycle and sagging the article into desired conformity with the surface contour of said mold, maintaining the dimensional stability of said mold during the heat-up and cool-down of the sagging cycle with said mold having a maximum coefficient of thermal expansion of about 20×10^{-7}/° C., and facilitating the dissipation of heat energy for effective thermal cycling by limiting the thickness of said glass-ceramic sagging mold to a maximum not substantially greater than one-half inch.

4,059,429

GLASS PRESSING PLUNGER COOLING

Arieh Carmi, Big Flats; Zung S. Chang, Painted Post, and Thomas J. Rayeski, Corning, all of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Oct. 4, 1976, Ser. No. 729,409
Int. Cl.[2] C03B *11/06, 9/38*
U.S. Cl. 65—355 2 Claims



1. In a hollow plunger (10) including corner regions (14, 15) of relatively sharp curvature joining regions (11, 12, 13) of substantially lesser curvature and for press forming in a complimental mold (20) a glass article (19) having similarly curved regions and a support member (26) for said plunger, apparatus for differentially cooling said regions, such apparatus comprising; a baffle member (18) disposed in the hollow of said plunger and providing a cooling fluid flow channel (9) between the outer surface (18*b*) of the baffle member (18) and the inner surface (10*e*) of the plunger (10) such baffle member (18) embodying,

A. a cooling fluid supply plenum chamber (18*c*),

B. a plurality of cooling fluid flow passages (38, 38*a*) connecting said plenum chamber (18*c*) with said cooling fluid flow channel (9) there being a substantially greater number of such passages in said corner regions (14, 15) of the plunger (10) than in said regions (11, 12, 13) thereof of lesser curvature, and

C. a plurality of spent cooling fluid exhaust passages (36, 37, 37*a*) connecting said fluid flow channel (9) with spent cooling fluid exhaust passages (33, 34) embodied in said support member (26) there being a substantially greater number of said spent cooling fluid exhaust passages in said corner regions (14, 15) of the plunger (10) than in said regions (11, 12, 13) thereof of lesser curvature.

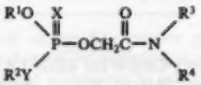
4,059,430

ORGANIC (THIO) PHOSPHORIC ACID ESTER COMPOUNDS AND HERBICIDAL COMPOSITIONS

Masahiro Aya; Junichi Saito; Toyohiko Kume, and Kazuomi Yasui, all of Tokyo, Japan, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Sept. 22, 1976, Ser. No. 725,614
Claims priority, application Japan, Oct. 22, 1975, 50-126321
Int. Cl.[2] A01N *9/36;* G07F *9/09, 9/165*
U.S. Cl. 71—86 32 Claims

1. Organic (thio)phosphoric acid ester compounds of the formula



wherein

R^1 is alkyl of from 1 to 6 carbon atoms, cyclohexyl or phenyl,

R^2 is alkyl of from 1 to 6 carbon atoms,

R^3 is alkyl of from 1 to 6 carbon atoms,

R^4 is cyclohexyl or phenyl,

X is oxygen or sulfur, and

Y is oxygen or sulfur.

26. Method of combatting undesired vegetation which method comprises applying to such vegetation or its habitat effective amounts of an organic (thio)phosphoric acid ester compound as claimed in claim 1.

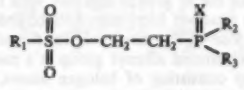
4,059,431

PLANT GROWTH REGULATOR

Tetsuo Takematsu; Makoto Konnai, both of Utsunomiya; Makoto Takeda; Nobuhiko Fuga, both of Ami; Kaoru Ikeda, Utsunomiya, and Kiyoshi Shugaya, Ami, all of Japan, assignors to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan

Division of Ser. No. 580,344, May 23, 1975. This application May 27, 1976, Ser. No. 690,779
Claims priority, application Japan, May 27, 1974, 49-59491; Dec. 30, 1974, 50-847; Apr. 28, 1975, 50-50649
Int. Cl.[2] A01N *9/36;* C07C *143/68*
U.S. Cl. 71—87 7 Claims

1. A compound of the formula



wherein R_1 is a member selected from the group consisting of substituted or unsubstituted C_1 to C_{12} linear- or branched-alkyl C_5 to C_{12} cyclo-alkyl, substituted or unsubstituted C_2 to C_{12} linear-or branched- alkenyl or C_5 to C_{12} cycloalkenyl and substituted or unsubstituted C_6 to C_{14} carbocyclic aryl; R_2 and R_3 are identical or different and each represents a group or an atom selected from the group consisting of (1) –OR′ in which R′ is a member selected from the group consisting of a hydrogen atom, substituted or unsubstituted C_1 to C_{12} linear- of branched- alkyl or C_5 to C_{12} cycloalkyl, substituted or unsubstituted C_2 to C_{12} linear- or branched- alkenyl or C_5 to C_{12} cycloalkenyl and substituted or unsubstituted C_6 to C_{14} carbocyclic aryl, (2) –SR′ in which R′ is as defined above, (3) $-N(R')_2$ in which R′ is the same as defined above and the two R′ groups

are identical or different, and (4) a halogen atom; and X is S or O; the substituent for the substituted alkyl group or the substituted alkenyl group is a member selected from the group consisting of halogen atoms, cyano, nitro, alkoxycarbonyl with the alkoxy moiety containing 1 to 12 carbon atoms, alkoxy of 1 to 12 carbon atoms, carboxyl, alkanoyl of 1 to 12 carbon atoms, alkanoyloxy of 1 to 12 carbon atoms, benzoyloxy, thiocyanato, isothiocyanato, acetamide, acetylthio, phosphono, β-phosphonoethyloxysulfonyl, $(CH_3)_3{}^+N^{Cl}—CH_2—CH_2—$, phenyl, phenylalkyl of 7 to 14 carbon atoms, and alkylthio with the alkyl moiety containing 1 to 12 carbon atoms; and the substituent for the substituted aryl group is a member selected from the group consisting of alkyl of 1 to 6 carbon atoms, halogen atoms, acetyl, acetamido, nitro, cyano, carboxyl, alkoxy of 1 to 6 carbon atoms and hydroxyl; with the proviso that when X is O and both R_2 and R_3 are the group –OR′, at least one of —OR′ groups is –OH, and when X is S, both R_2 and R_3 are not the groups $—N(R')_2$ at the same time.

2. A method for regulating the growth of plants which comprises applying to a plant or to the locus in which a plant is growing or is to be grown, a plant growth regulating amount of a compound according to claim 1.

4,059,432
PLANT GROWTH REGULATOR

Tetsuo Takematsu; Makoto Konnai, both of Utsunomiya; Makoto Takeda; Nobuhiko Fuga, both of Ami; Kaoru Ikeda, Utsunomiya, and Kiyoshi Shugaya, Ami, all of Japan, assignors to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan

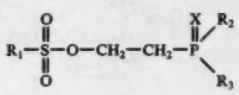
Filed May 23, 1975, Ser. No. 580,344

Claims priority, application Japan, May 27, 1974, 49-59491; Dec. 30, 1974, 50-847; Apr. 28, 1975, 50-50649

Int. Cl.² A01N 9/36; C07C 143/68; C07D 295/16

U.S. Cl. 71—87 **7 Claims**

1. A compound of the formula



wherein R_1 is a member selected from the group consisting of substituted or unsubstituted C_1 to C_{12} linear- or branched-alkyl, C_5 to C_{12} cyclo-alkyl, substituted or unsubstituted C_2 to C_{12} linear- or branched-alkenyl or C_5 to C_{12} cycloalkenyl and substituted or unsubstituted C_6 to C_{14} carbocyclic aryl; at least one of R_2 and R_3 is morpholino and the other is selected from the group consisting of (1) —OR′ in which R′ is a member selected from the group consisting of a hydrogen atom, substituted or unsubstituted C_1 to C_{12} linear- or branched-alkyl or C_5 to C_{12} cyclo-alkyl, substituted or unsubstituted C_2 to C_{12} linear- or branched-alkenyl or C_5 to C_{12} cyclo-alkenyl and substituted or unsubstituted C_6 to C_{14} carbocyclic aryl, (2) —SR′ in which R′ is as defined above, (3) $—N(R')_2$ in which R′ is the same as defined above or the R′ groups together with the nitrogen to which they are attached form morpholino, and (4) a halogen atom; and X is S or O; the substituent for the substituted alkyl group or the substituted alkenyl group is a member selected from the group consisting of halogen atoms, cyano, nitro, alkoxycarbonyl with the alkoxy moiety containing 1 to 12 carbon atoms, alkoxy of 1 to 12 carbon atoms, carboxyl, alkanoyl of 1 to 12 carbon atoms, alkanoyloxy of 1 to 12 carbon atoms, benzoyloxy, thiocyanato, isothiocyanato, acetamide, acetylthio, phosphono, β-phosphonoethyloxysulfonyl, $(CH_3)_3{}^+N^{Cl}—CH_2—CH_2—$, phenyl, phenylalkyl of 7 to 14 carbon atoms, and alkylthio with the alkyl moiety containing 1 to 12 carbon atoms; and with the substituent for the substituted aryl group is a member selected from the group consisting of alkyl of 1 to 6 carbon atoms, halogen atoms, acetyl, acetamido, nitro, cyano, carboxyl, alkoxy of 1 to 6 carbon atoms and hydroxyl; with the proviso that when X is S, both R_2 and R_3 are not the groups morpholino or $—N(R')_2$ at the same time.

2. A method for regulating the growth of plants which comprises applying to a plant or to the locus in which a plant is growing or is to be grown a plant growth regulating amount of a compound according to claim 1.

4,059,433
3-ALKOXYISOTHIAZOLE DERIVATIVES AS HERBICIDES

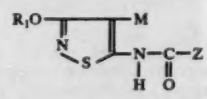
Loren Kenneth Gibbons, Medina, N.Y., assignor to FMC Corporation, Philadelphia, Pa.

Filed June 18, 1976, Ser. No. 697,457

Int. Cl.² A01N 9/12; C07D 275/02

U.S. Cl. 71—90 **14 Claims**

1. A substituted isothiazolylurea of the formula:



in which R_1 is alkyl of 1–5 carbon atoms; M is cyano or carbamoyl; Z is $—NR_2R_3$ or R_4, wherein R_2 is alkyl of 1–5 carbon atoms, R_3 is alkyl of 1–5 carbon atoms or hydrogen, R_4 is alkyl of 1–5 carbon atoms.

13. An herbicidal composition comprising an herbicidally effective amount of a compound of claim 1 in admixture with an extruder.

14. A method of preventing and destroying undesired plant growth which comprises applying to the locus to be protected an herbicidally effective amount of a compound of claim 1.

4,059,434
CYCLOALKANAPYRAZOLE HERBICIDES

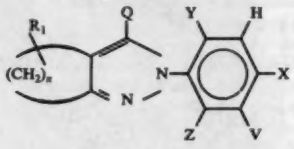
Anthony David Wolf, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 622,763, Oct. 15, 1975, abandoned, and Ser. No. 640,348, Dec. 12, 1975, abandoned. This application Aug. 26, 1976, Ser. No. 717,014

Int. Cl.² A01N 9/22; C07D 231/56

U.S. Cl. 71—92 **105 Claims**

1. A compound of the formula



where

n is 3, 4 or 5;

R_1 is hydrogen or methyl;

Q is fluorine, chlorine, bromime or iodine;

X is fluorine, chlorine, bromine, iodine, cyano, methoxy or nitro;

Y is hydrogen, fluorine or chlorine;

Z is hydrogen or flurorine; and

V is hydrogen, fluorine, chlorine or methoxy; with the proviso that

a. when n is 5, R_1 must be hydrogen, Q must be chlorine or bromine, Z and V must both be hydrogen and Y must be hydrogen or fluorine;

b. when n is 3 or 4 and Q is fluorine or iodine, R_1, Z and Y must be hydrogen and Y must be hydrogen or fluorine;

c. when n is 3 and R_1 is methyl, Q must be chlorine or bromine, Y must be hydrogen or fluorine and Z and V must be hydrogen; and

d. when V is other than hydrogen, X must be fluorine, chlorine or bromine and Z must be hydrogen.

32. A composition for the control of undesirable vegetation

consisting essentially of an effective amount of a compound of claim 1 and at least one of (a) an inert surface-active agent, and (b) a solid or liquid diluent.

63. A method for the control of undesirable vegetation comprising applying to the locus of such undesirable vegetation a herbicidally effective amount of a compound of claim 1.

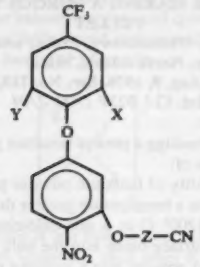
4,059,435

HERBICIDAL 4-TRIFLUOROMETHYL-3-CYANOALKOXY-4-NITRO DIPHENYL ETHERS

Wayne O. Johnson, Warminster, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Filed Aug. 31, 1976, Ser. No. 719,471
Int. Cl.² C07C *121/66;* A01N *9/20*
U.S. Cl. 71—105 **12 Claims**

1. A compound of the formula



wherein

X is a hydrogen atom, a halogen atom, a trifluoromethyl group, a (C_1–C_4)alkyl group, or a cyano group,

Y is a hydrogen atom, a halogen atom, or a trifluoromethyl group, and

Z is a divalent (C_1–C_4)alkylene group.

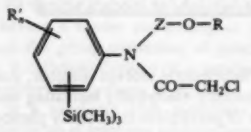
4,059,436

HERBICIDAL COMPOSITIONS CONTAINING SILYLATED CHLOROACETANILIDES

Manfred Kühne, Pfeffingen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 551,463, Feb. 20, 1975, Pat. No. 3,996,254. This application Nov. 11, 1976, Ser. No. 740,893
Claims priority, application Switzerland, Feb. 25, 1974, 02632/74
Int. Cl.² A01N *9/20*
U.S. Cl. 71—118 **10 Claims**

1. A plant growth regulating agent containing as active ingredient an effective amount of a silylated chloroacetanilide of formula I



(I)

wherein

R represents a lower alkyl group having at most 4 carbon atoms, a group —CH_2—CH_2—$Si(CH_3)_3$, a group —CH_2—$Si(CH_3)_3$ or a trimethylsilyl group,

Z represents a straight or branched alkylene chain having at most 3 carbon atoms,

R′ represents halogen, lower alkyl or alkoxy having at most 3 carbon atoms or trimethylsilyl, and

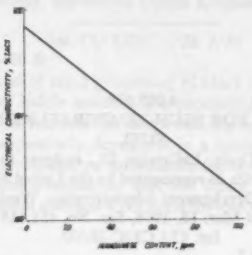
n represents the number 0 or 1, together with a suitable carrier.

4,059,437

OXYGEN-FREE COPPER PRODUCT AND PROCESS

Donald John Nesslage, Old Bridge; Lin Sheng Yu, Princeton, both of N.J., and Michael Francis Shaw, El Paso, Tex., assignors to Phelps Dodge Industries, Inc., New York, N.Y.

Filed July 2, 1975, Ser. No. 592,622
Int. Cl.² C22C *9/05;* C22F *1/08*
U.S. Cl. 75—76 **22 Claims**



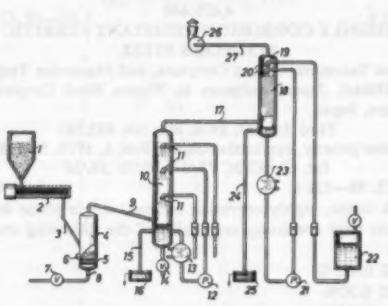
1. An improved oxygen-free copper product consisting essentially of non-deoxidized oxygen-free copper containing normal impurities and manganese in addition from approximately 1 to approximately 100 parts per million by weight, further characterized by having a minimum electrical conductivity of at least 100% I.A.C.S.

4,059,438

PROCESS FOR THE WORK-UP OF A CONTAMINATED INACTIVE MERCURY(II)CHLORIDE/ACTIVE CARBON-CATALYST

Heinz Müller, Bruhl, Germany, assignor to Hoechst Aktiengesellschaft, Knapsack, near Cologne, Germany

Continuation of Ser. No. 530,872, Dec. 9, 1974, abandoned. This application Aug. 27, 1976, Ser. No. 718,108
Claims priority, application Germany, Dec. 13, 1973, 2361917
Int. Cl.² C22B *43/00*
U.S. Cl. 75—81 **4 Claims**



1. A process for the work-up of a contaminated inactive mercury (II) chloride/active carbon-catalyst having a mercury (II) chloride content within the range 1.5 to 4 weight% by burning said catalyst in a furnace, which process comprises charging said furnace with constituents initially including a portion of said catalyst; igniting said catalyst portion by means of a pilot flame introduced into said furnace; then continuously charging said furnace with the catalyst balance portion together with air or oxygen or mixture thereof so as to accomplish a complete and self-sustaining combustion of the active carbon contained in said catalyst, the air or the oxygen or the mixture thereof being fed in the quantity necessary to produce combustion gases containing metallic mercury in vapor form together with between 0.5 and 5% by volume of oxygen and

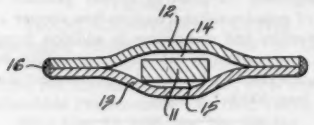
between 2 and 15% by volume of carbon monoxide; injecting water into the combustion gases issuing from said furnace so as to condense metallic mercury therefrom; conveying the remaining gases through a scrubbing zone having an alkaline liquor therein; and delivering the gases leaving the scrubbing zone to the atmosphere, said gases containing less than 1 mg mercury/cbm.

4,059,439

PU-ZR ALLOY FOR HIGH-TEMPERATURE FOIL-TYPE FUEL

Franklin D. McCuaig, LaGrange, Ill., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Mar. 15, 1974, Ser. No. 451,615
Int. Cl.[2] C22C 28/00
U.S. Cl. 75—122.7 2 Claims



1. A nuclear reactor fuel alloy consisting essentially of 7 weight percent zirconium, balance plutonium, characterized in that said alloy is castable, is rollable to thin foils as thin as 0.0005 inch thick, and is compatible with stainless steel cladding.

4,059,440

HIGHLY CORROSION RESISTANT FERRITIC STAINLESS STEEL

Susumu Takemura; Masao Onoyama, and Masanobu Tsuji, all of Hikari, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Jan. 27, 1976, Ser. No. 652,703
Claims priority, application Japan, Feb. 1, 1975, 50-13824
Int. Cl.[2] C22C 38/22, 38/26, 38/28
U.S. Cl. 75—126 C 1 Claim

1. A stable, highly corrosion resistant single phase ferritic stainless steel consisting essentially of the following components:

C ≦ 0.015%
Si ≦ 0.30%
Mn ≦ 0.30%
P ≦ 0.040%
S ≦ 0.030%
Cr : 18.00 to 25.00%
Ni ≦ 0.20%
Cu ≦ 0.20%
Mo : 1.50 - 3.50%
N ≦ 0.015%
Ti : 4 × (C + N)% to 0.50%, and
Nb : 8 × (C + N)% to 1.00%, wherein
Ti/Nb : 0.5 to 1.2
(Ti + Nb)/(C + N) ≧ 8.0 in case of (C + N) < 0.017%, and
(Ti + Nb)/(C + N) ≧ 16.0 in case of (C + N) ≧ 0.017%

with the balance being iron and unavoidable impurities.

4,059,441

METALLIC GLASSES WITH HIGH CRYSTALLIZATION TEMPERATURES AND HIGH HARDNESS VALUES

Ranjan Ray, Morristown; Lee E. Tanner, Summit, and Carl F. Cline, Mendham, all of N.J., assignors to Allied Chemical Corporation, Morris Township, N.J.

Division of Ser. No. 495,458, Aug. 7, 1974, abandoned. This application Nov. 11, 1976, Ser. No. 740,897
Int. Cl.[2] C22C 27/02
U.S. Cl. 75—174 1 Claim

1. A metal alloy at least 50% amorphous having a high crystallization temperature and a high hardness, characterized in that the alloy has the composition ranging from $Ta_{35}Ni_sW_{65-s}$ to $Ta_{45}Ni_sW_{55-s}$, where "s" ranges from about 35 to 45 atom percent.

4,059,442

METHOD FOR MAKING A POROUS TANTALUM PELLET

Walter J. Bernard, Williamstown, Mass., assignor to Sprague Electric Company, North Adams, Mass.

Filed Aug. 9, 1976, Ser. No. 713,012
Int. Cl.[2] B22F 1/00, 7/04
U.S. Cl. 75—208 R 17 Claims

1. A method for making a porous tantalum pellet comprising the sequential steps of:

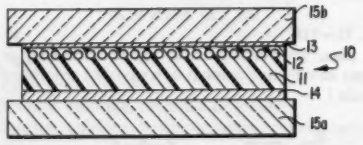
a. heating a quantity of tantalum powder particles having a surface oxide to a temperature greater than 400° C and no greater than 1200° C in a non-oxidizing atmosphere to dissolve said surface oxide into the bulk of said particles;
b. dispensing said powder into a molding press cavity;
c. providing a protective atmosphere for said powder from said heating through said dispensing;
d. compressing said powder in said cavity to provide a porous tantalum pellet; and
e. vacuum firing said pellet to sinter said compressed particles to each other.

4,059,443

ELECTRICAL INFORMATION STORAGE SYSTEM

Koji Okumura, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Jan. 9, 1975, Ser. No. 539,913
Int. Cl.[2] G03G 5/02
U.S. Cl. 96—1 PS 10 Claims



1. An electrical information storage member, comprising:

a layer of substantially electrically insulating material containing a layer of particulate electrically photoconductive material;
a layer of semiconductor material contacting one surface of the insulating layer, the semiconductor material having a resistivity of from about 500 to about 2,000 ohm-cm;
an electrode layer of a substantially transparent electrically conductive material contacting the opposite surface of the layer of insulating material; and
a plurality of electrode pairs contacting the semiconductor material on the side opposite the insulating layer.

5. The member of claim 1, wherein said semiconductor layer is of a thickness not greater than about 1 micron.

4,059,444

LIQUID DEVELOPMENT USING CONDUCTIVE INKS

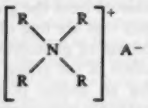
Chin H. Lu, Webster, and Richard A. Parent, Fairport, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 451,315, March 14, 1974, Pat. No. 3,904,936. This application July 19, 1976, Ser. No. 706,339

Int. Cl.² G03G 9/04, 13/10

U.S. Cl. 96—1 LY 5 Claims

1. A method for the development of latent electrostatic images on a photoconductive layer comprising applying to said latent image a conductive ink having a resistivity at 25° C of less than about 10^9 ohm-centimeters and a viscosity of about 50 to 1,000 centipoises at 25° C. and comprising about 0.1 to about 30 weight percent of a coloring agent capable of coloring said latent image when attracted thereto; about 0.05 to less than about 1.0 weight percent of a quaternary ammonium compound; about 5 to about 25 weight percent of a binder; about 1 to about 10 weight percent of a dispersing agent for said coloring agent; and the balance carrier, said quaternary ammonium compound being soluble in said carrier, said quaternary ammonium compound having the formula;



in which at least one R is a hydrocarbon having from about 1 to about 18 carbon atoms and each other R is a hydrogen or a hydrocarbon having from 1 to about 18 carbon atoms, and A is an anion.

4,059,445

NOBLE METAL IMAGE FORMING METHOD

Masamichi Sato, Asaka, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed July 30, 1975, Ser. No. 600,246

Claims priority, application Japan, Aug. 1, 1974, 49-88419

Int. Cl.² G03C 5/00, 7/00, 5/04, 5/26

U.S. Cl. 96—35 17 Claims

1. A method for producing an image comprising, forming a silver image on a photographic material which comprises a glass substrate having thereon at least one silver halide emulsion layer having a binder comprising at least one material selected from the group consisting of gelatin, colloidal albumin, casein, a cellulose derivative, a saccharide derivative, a synthetic hydrophilic colloid, a modified gelatin, a gelatin derivative, or a synthetic high molecular weight material, either directly or on at least one subbing layer on the substrate, by imagewise exposing and developing said photographic material; replacing said silver image with a noble metal image by contacting said silver image with a toning solution containing a compound containing a noble metal having an ionization tendency smaller than the ionization tendency of silver, said noble metal being selected from the group consisting of gold, platinum, palladium, rhodium, iridium and ruthenium, and then subsequently heating after toning, the photographic material in an oxygen-containing gas to a temperature between about 350° to 600° C for a period sufficient to thermally decompose and substantially remove the organic components on the substrate.

4,059,446

PROCESSING OF PHOTOGRAPHIC SILVER HALIDE MATERIAL

Edwin Hendrik Hazenbosch, Mechelen; Antoine Roberta Van Rossen, Brustem; Roland Francois Beels, Linkebeek, and Marcel Frans Aelterman, Mortsel, all of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

Filed Apr. 12, 1976, Ser. No. 676,006

Claims priority, application United Kingdom, Apr. 30, 1975, 18067/75

Int. Cl.² G03C 5/26, 5/38

U.S. Cl. 96—50 R 10 Claims

1. A method of rapid processing of black and white photographic silver halide material in a processing machine of the automatic type wherein the imagewise exposed photographic material is sequentially developed in a hardening developer, fixed in a thiosulphate or thiocyanate fixing solution, washed and dried, characterized in that the fixing medium and/or washing medium contains a polyoxyethylene compound of the formula:

$$R—(OCH_2CH_2)_nOH$$

wherein:

n is an integer of at least 12, and

R is an aliphatic group containing from 6 to 24 carbon atoms or an alkyl phenyl group comprising C_6–C_{24} carbon atoms in the alkyl chain or alkyl naphthyl comprising C_4–C_{10} carbon atoms in the alkyl chain.

4,059,447

PHOTOGRAPHIC MATERIAL CONTAINING OXAZOLINONE-2 COUPLERS

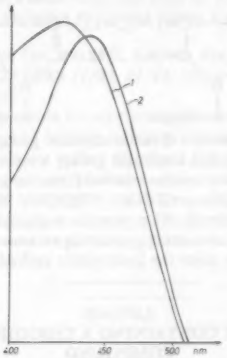
Ernst Meier, Munich; Hans Heinrich Credner, Hohenschaeftlarn; Wolfgang Lassig, Munich; Karl Küffner, Unterhaching, and Karl-Wilhelm Schranz, Odenthal-Hahnenberg, all of Germany, assignors to AGFA-Gevaert Aktiengesellschaft, Germany

Filed Dec. 23, 1975, Ser. No. 643,687

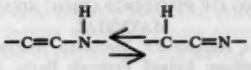
Claims priority, application Germany, Dec. 31, 1974, 2461949

Int. Cl.² G03C 7/00, 1/40

U.S. Cl. 96—56.4 9 Claims



9. In the process for the production of photographic images by exposure and development of a light-sensitive photographic material containing at least one light-sensitive silver halide emulsion layer with an aromatic colour developer compound containing primary amino groups in the presence of a colour coupler that has a structural coupling moiety to which the oxidation product of a silver halide color developer couples to form a coupling product, the improvement according to which the color coupler is a monocyclic-1,3-oxazolinone-2-coupling color coupler having the tautomeric



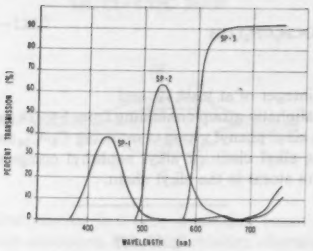
structure.

4,059,448

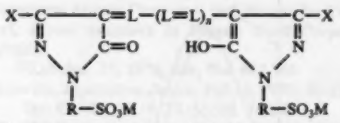
DYE CONTAINING PHOTOGRAPHIC SENSITIVE ELEMENTS

Masatoshi Sugiyama; Eiichi Kato, and Yasuharu Nakamura, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Sept. 12, 1975, Ser. No. 613,013
Claims priority, application Japan, Sept. 12, 1974, 49-105289
Int. Cl.² G03C *1/84*
U.S. Cl. 96—84 A 11 Claims



1. A silver halide photographic light-sensitive element comprising at least one hydrophilic colloid layer which contains poly(2-diethylamino ethylmethacrylate), the poly(2-diethylamino ethymethacrylate) being a water-soluble high molecular weight material which has a basic residue in a main chain thereof or in a branch chain thereof and which is compatible with gelatin, the poly(2-diethylamino ethymethacrylate) being present in an amount of 80 to 800 mg/m² which is effective for mordanting, and at least one oxonal dye represented by the following formula (I):



wherein R represents a divalent aliphatic group; M represents a cation; L represents a methine group; *n* represents 0, 1 or 2, and -X represents a residue selected from the group consisting of —X¹, —CH_2X^1, —CONX¹, NHCOX¹, NHCONHX¹ or NHCSNHX¹, wherein X¹ represents a phenyl group, the at least one oxonol dye being present in an amount effective to photographically color the hydrophilic colloid layer.

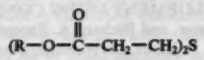
4,059,449

PHOTORESIST CONTAINING A THIODIPROPIONATE COMPOUND

Thomas Francis Rosenkranz, Flemington, and Richard Joseph Himics, Skillman, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Sept. 30, 1976, Ser. No. 728,426
Int. Cl.² G03C *1/52, 1/68*
U.S. Cl. 96—91 D 13 Claims

1. A photoresist composition comprising:
a. an alkali-soluble novolak resin
b. a naphthoquinone-(1,2)-diazide sulfonic acid ester sensitizer; and
c. a thiodipropionate compound of the formula



wherein R is an alkyl or alkenyl group having 6 to 24 carbon atoms and wherein the relative proportion of the thiodipropionate compound is from about 0.5 to 15 parts by weight per 100 parts by weight of the novolak resin.

4,059,450

DIRECT POSITIVE SILVER HALIDE ELEMENTS

Willy Joseph Vanassche, Kontich; Herman Alberik Pattyn, Kapellen, both of Belgium; Erik Moisar, and Sieghart Klotzer, both of Cologne, Germany, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

Filed Nov. 20, 1973, Ser. No. 417,499
Claims priority, application Germany, Dec. 8, 1972, 2260117
Int. Cl.² G03C *1/36, 1/28*
U.S. Cl. 96—101 23 Claims

1. Photographic material containing at least one direct-positive silver halide emulsion layer containing surface fogged silver halide grains selected from the group consisting of:
a. silver halide grains that are free of internal centers promoting the deposition of photolytic silver and have adsorbed to the surface of the grains an electron-accepting compound having an anodic polarographic half-wave potential and a cathodic polarographic half-wave potential which when added together give a positive sum, and
b. silver halide grains having a central silver halide core containing centers promoting the deposition of photolytic silver and a silver halide shell coated thereover,
wherein the silver halide grains have been precipitated so as to form in the silver halide grains (a) or in the silver halide shell of grains (b) an external shell of silver halide containing silver iodide in an amount up to 20 mole percent based on the silver halide of the external shell sufficient to provide an emulsion having improved sensitivity and which produces images of improved maximum density, the remainder of the silver halide grains being substantially free of silver iodide.

4,059,451

ELECTROLESS COPPER PLATING SOLUTION

Masahiro Oita, Kashiwara; Hyogo Hirohata, and Nobuhiro Hamasaki, both of Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed July 12, 1976, Ser. No. 704,618
Int. Cl.² C23C *3/02*
U.S. Cl. 106—1.26 4 Claims

1. An electroless copper plating solution comprising 0.001 to 0.30 mole/l of copper salt, 0.001 to 0.60 mole/l of a complexing agent for cupric ions, 0.0005 to 0.75 mole/l of a reducing agent to reduce cupric ions, 0.05 to 2.0 mole/l of alkali hydroxide, and 0.001 to 1.0 g/l of $R_fSO_2N(R')R(C_2H_4O)_mH$, wherein R_f is a perfluoroalkyl group containing 3 to 12 carbon atoms, R is an alkylene bridging group containing 1 to 12 carbon atoms, R' is a member selected from the group consisting of a hydrogen atom and an alkyl group containing 1 to 10 carbon atoms, and *m* is an integer of 1 to 15.

4,059,452

METAL SURFACE TREATMENT

Masanori Nishijima; Nobuyuki Oda, both of Yokohama, and Haruyoshi Terada, Tanashi, all of Japan, assignors to Oxy Metal Industries Corporation, Warren, Mich.

Filed Jan. 28, 1975, Ser. No. 544,616
Claims priority, application Japan, Jan. 28, 1974, 49-10960
Int. Cl.² C09D *5/08*; C23F *7/26*
U.S. Cl. 106—14 6 Claims

1. An aqueous composition suitable for imparting corrosion resistance to a metal surface comprising a nexavalent chro-

mium compound and from 1 to 30 g/l of non-ionic surfactants of the formula

$$RO(CH_2CH_2O)_nH$$

wherein R = a saturated or unsaturated aliphatic radical of 5 to 25 carbon atoms, $n = 2$ to 30 and glycine in a concentration of from 1 to 50 g/l.

4,059,453

METHOD OF MAKING MOLDS FOR THE CASTING OF METALS

Werner Dittrich, Herten, Baden, and Friedhelm Schnippering, Troisdorf, both of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany

Continuation of Ser. No. 510,831, Sept. 30, 1974, abandoned. This application May 12, 1976, Ser. No. 685,556
Claims priority, application Germany, Oct. 3, 1973, 2349593
Int. Cl.² B28B 7/34
U.S. Cl. 106—38.3 19 Claims

1. In a process for making a multilayer mold comprising applying to a foundry mold form a first ceramic composition containing a refractory aggregate and a binder selected from the group consisting of an alcoholate of titanium, aluminum or zirconium and an alkyl silicate, hardening said first ceramic composition on said mold form to form a first layer and adding onto said first layer before said first layer has fully hardened a second ceramic composition in the form of a supportive backfill and hardening said second ceramic composition, the improvement comprising as said first ceramic composition,

A. A first refractory material of grain size 100 to 200 (Tyler) mesh and a second refractory material of 14 to 32 (Tyler) mesh, the volumetric ratio of said first refractory material being 1–2 : 1 and;

B. An anti-settling agent in an amount between 0.1 and 10 weight percent, said anti-settling agent selected from the group consisting of montmorillonite, bentonite, pyrogenic silica, asbestos flour, asbestos filaments, ethylcellulose, talc and mica.

4,059,454

GREEN COLORED GLASSES

Richard F. Reade, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed June 16, 1976, Ser. No. 696,582
Int. Cl.² C03B 32/00; C03C 15/00, 3/22
U.S. Cl. 106—39.7 11 Claims

1. A method for making a transparent green glass article containing crystallities in an amount of less than about 5% by volume, said crystallites consisting of nickel spinel, which consists of the steps of:

a. melting a batch for a glass having an overall composition selected from the group:

A. a glass consisting essentially, by weight on the oxide basis, of about 3–7.5% Li_2O, 18–28% Al_2O_3, 58–72% SiO_2, 0.3–4.5% NiO, 2.5–8% TiO_2, and 0–3% ZrO_2, the molar ratio of Al_2O_3 to the sum of all modifier ions being at least 0.95; and

B. a glass approximating the stoichiometry of carnegieite consisting essentially, by weight on the oxide basis, of about 10–20% Na_2O, 30–35% Al_2O_3, 35–40% SiO_2, 1–3% NiO, 4–8% TiO_2, 0–10% K_2O, and 0–3% ZrO_2, the molar ratio of Al_2O_3 to the sum of all modifier ions being at least 0.95;

b. simultaneously cooling said melt to at least below the transformation range threof and shaping a transparent glass article therefrom;

c. heating said transparent glass article to a temperature of at least about 675° C., but not more than about 900° C., for a period of time sufficient to cause the growth in situ of nickel spinel crystallites; and then

d. cooling said crystallized article to room temperature, said article being transparent with a green coloration.

4. A transparent green glass article containing crystallites in an amount of less than about 5% by volume, said crystallites consisting of nickel spinel, made in accordance with claim 1.

4,059,455

PRODUCTION OF FAST-SETTING BONDED AGGREGATE STRUCTURES

Robert W. Limes, Seven Hills, and Robert O. Russell, Fairview Park, both of Ohio, assignors to Republic Steel Corporation, Cleveland, Ohio

Filed June 17, 1976, Ser. No. 697,114
Int. Cl.² C04B 35/04
U.S. Cl. 106—58 6 Claims

1. A method of making a fast-setting bonded aggregate structure, comprising the steps of

a. establishing a mixture of

i. an aggregate containing at least about 1% magnesia and

ii. ammonium phosphate in aqueous solution in an amount equal to at least about one part of P_2O_5 per 100 parts of said aggregate, the composition of said phosphates being between about 20% and 58% polyphosphates, balance orthophosphate;

b. disposing said mixture for setting, prompty after establishment thereof; and

c. allowing said mixture to set as thus disposed, while

d. continuously maintaining said mixture, throughout the performance of steps (a) and (b) and for at least the first several days of performance of step (c), in a situation of ambient atmospheric temperature not exceeding about 150° F.

4,059,456

COMPOSITION FOR ACCELERATING THE SETTING OF CALCINED GYPSUM AND THE PRODUCT FORMED THEREBY

Felix J. DeRooy, Plaster City; Thell D. Daniel, Plaster City; Erle C. Annes, Plaster City, and Billy G. Arnold, El Centro, all of Calif., assignors to United States Gypsum Company, Chicago, Ill.

Filed Oct. 21, 1975, Ser. No. 624,367
Int. Cl.² C04B 11/22, 11/24, 13/14, 11/14
U.S. Cl. 106—114 11 Claims

1. A dry composition for accelerating the setting reaction of an aqueous slurry of calcium sulfate hemihydrate, comprising finely ground calcium sulfate dihydrate and a lignosulfonate, said lignosulfonate being present in an amount of from about 0.5 to about 99% by weight of said composition.

3. A composition according to claim 1, wherein said lignosulfonate has a wood sugar associated therewith.

4,059,457

CHITIN SOLUTION

Paul Rolland Austin, Wilmington, Del., assignor to The University of Delaware, Newark, Del.

Continuation-in-part of Ser. No. 659,280, Feb. 19, 1976. This application Sept. 30, 1976, Ser. No. 728,257
Int. Cl.² C09J 3/04
U.S. Cl. 106—203 3 Claims

1. A solution of chitin in dimethylacetamide or N-methylpyrrolidone or mixtures of these amides in conjunction with a minor amount of lithium chloride.

4,059,458

OIL-IN-WATER EMULSION CONTAINING STARCH ESTERS

Felix Joseph Germino, Palos Park; Francis E. Kite, Riverside, and Edwin H. Christensen, Western Springs, all of Ill., assignors to CPC International Inc., Englewood Cliffs, N.J.

Division of Ser. No. 385,508, Aug. 3, 1973, abandoned, which is a continuation-in-part of Ser. No. 302,463, Oct. 31, 1972, abandoned. This application July 1, 1974, Ser. No. 485,049
Int. Cl.[2] C08L 3/06
U.S. Cl. 106—213 16 Claims

1. A stable oil-in-water emulsion which comprises:
a. a continuous aqueous phase;
b. a discontinuous phase emulsified in said continuous phase comprising an oil or lipid; and
c. an emulsifying agent for maintaining said stable oil-in-water emulsion consisting essentially of a starch ester of at least one aliphatic carboxylic acid having 2 – 4 carbons having a degree of substitution of from about 0.05 to about 1.0.

4,059,459

LEAD CHROMATE PIGMENT WITH IMPROVED THERMAL STABILITY

James Francis Higgins, Livingston, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 561,436, March 24, 1975, abandoned. This application Oct. 7, 1976, Ser. No. 730,518
Int. Cl.[2] C09C 1/20, 3/06
U.S. Cl. 106—298 5 Claims

1. A dense silica-coated chromate pigment prepared by the steps of
i. adding from 0.2% to 1% by weight of a soluble silicate compound, calculated as SiO_2 and based on the weight of the base lead chromate pigment, to an aqueous solution of a soluble salt of chromate and, optionally, at least one soluble salt selected from the group consisting of sulfate and molybdate,
ii. contacting the aqueous solution of step (i) with an aqueous lead salt to precipitate the base lead chromate pigment,
iii. treating the base lead chromate pigment with at least one hydrous metal oxide, and
iv. applying a coating of dense, amorphous silica to the treated lead chromate pigment of step (iii) in an amount from 2% to 40% by weight, calculated as SiO_2 and based on the weight of the dense silica-coated lead chromate pigment.

4,059,460

SOLID ANHYDROUS DEXTROSE

Charles E. Schollmeier, and Roger S. Leiser, both of Decatur, Ill., assignors to A. E. Staley Manufacturing Company, Decatur, Ill.

Filed Nov. 7, 1975, Ser. No. 629,739
Int. Cl.[2] C13K 1/10, 1/06
U.S. Cl. 127—29 12 Claims

1. A process for preparing a solid, essentially free-flowing and non-compacting anhydrous, dextrose conversion syrup product from a dextrose conversion syrup having a dextrose content of at least 93% (dry substance weight basis), said process comprising the steps of:
A. preparing a molten dextrose conversion syrup concentrate having a dry weight solids content between 85% and 93% and a temperature in excess of 230° F. from the dextrose conversion syrup,
B. simultaneously shearing and cooling the concentrate to a temperature below 200° F. to form a more viscous but fluid dextrose conversion syrup mass,
C. depositing the fluid mass in a confining zone while maintaining the fluid mass at a solids level below 93% and the temperature above the dextrose hydrate crystallization temperature,
D. solidifying the fluid mass into a solid dextrose conversion syrup mass within the confining zone,
E. granulating the solid dextrose conversion syrup mass into a multiplicity of particles, and
F. dehydrating the dextrose conversion syrup particles to a water content of less than 2% by weight to provide a particulated, essentially free-flowing and non-compacting, anhydrous, dextrose conversion syrup product.

4,059,461

METHOD FOR IMPROVING THE CRYSTALLINITY OF SEMICONDUCTOR FILMS BY LASER BEAM SCANNING AND THE PRODUCTS THEREOF

John C. C. Fan, and Herbert J. Zeiger, both of Chestnut Hill, Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Dec. 10, 1975, Ser. No. 639,540
Int. Cl.[2] H01L 21/26
U.S. Cl. 148—1.5 34 Claims

FORM A CONDUCTIVE LAYER ON A SUBSTRATE
DEPOSIT A SEMICONDUCTOR FILM ON THE CONDUCTIVE LAYER
SCAN THE SEMICONDUCTOR FILM WITH A FOCUSED LASER BEAM TO IMPROVE ITS CRYSTALLINITY
FORM A TRANSPARENT RECTIFYING CONTACT WITH THE SCANNED FILM

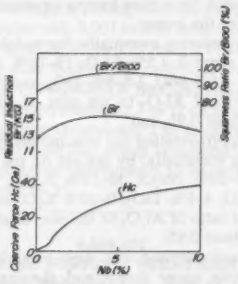
1. A method for improving the crystallinity of a semiconductor film by scanning it with a focused beam from a continuous wave laser having a wavelength at which the semiconductor film has an absorption coefficient sufficient to allow laser radiation to be absorbed over the semiconductor film thickness.

4,059,462

NIOBIUM-IRON RECTANGULAR HYSTERESIS MAGNETIC ALLOY

Hakaru Masumoto, Sendai; Yuetsu Murakami, Izumi, and Naoji Nakamura, Sendai, all of Japan, assignors to The Foundation: The Research Institute of Electric and Magnetic Alloys

Continuation-in-part of Ser. No. 536,635, Dec. 26, 1974, abandoned. This application Oct. 29, 1976, Ser. No. 737,053
Int. Cl.[2] C04B 35/00
U.S. Cl. 148—31.55 8 Claims



1. A rectangular hysteresis magnetic material made of alloy consisting of 0.5 to 10% by weight of niobium and the balance of iron, said material being cold worked and then heat treated and having a coercive force of more than 2 oersteds, a residual induction of more than 12600 gauss and a squareness ratio of more than 80%.

4,059,463

PROCESS FOR PRODUCING FERROMAGNETIC POWDER

Masashi Aonuma; Tatsuji Kitamoto, and Goro Akashi, all of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-Ashogara, Japan

Continuation-in-part of Ser. No. 326,358, Jan. 24, 1973, abandoned, which is a continuation of Ser. No. 552,013, Feb. 24, 1975, abandoned. This application June 7, 1976, Ser. No. 693,669

Claims priority, application Japan, Jan. 27, 1972, 47-10389

Int. Cl.[2] H01F *1/02*

U.S. Cl. 148—105 18 Claims

1. A process for producing a ferromagnetic powder which comprises:

a. preparing an aqueous solution by (a) adding metal salts, hypophosphite ions, and precious metal ions to water; said metal salts consisting essentially of salts of nickel or cobalt or both, said metal salts also including salts of metals wherein the metal is selected from the group consisting of La, Ce, Nd, Sm, Al, S, Cr, Mn, Fe, Cu and Zn in an amount of 0 - 10% by weight of the total salts used; the concentration of total salts in the aqueous solution being in the range of 0.001 to 1 mole per liter and adjusting the pH to greater than 5, (b) adding an organic solvent to the aqueous solution at the same time said metal salts, hypophosphite ions and said precious metal ions are added to said water or up to the time immediately after the commencement of a hydrogen gas evolution which accompanies the reaction of said metal salts and hypophosphite ions; said organic solvent being non-reactive with the metal salts or hypophosphite ions, said organic solvent having a melting point lower than 65° C;

2. reacting and reducing the metal salts with the hypophosphite ions to form a precipitate by heating the aqueous solution to a temperature of 65° to 95° C, applying a pressure of 0.5 to 5 atmospheres, and subjecting the aqueous solution to a magnetic field of from 10 to 10,000 oe;

3. collecting the precipitate obtained in (2); and

4. washing the precipiate of (3).

4,059,464

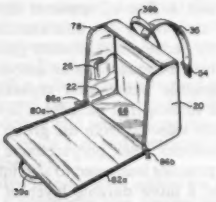
METHOD OF MAKING FOLD-OUT ZIPPER BAG

Thomas L. Geller, Colts Neck, and Harold Rabinowitz, Lakewood, both of N.J., assignors to Dart Industries Inc., Los Angeles, Calif.

Division of Ser. No. 625,980, Oct. 28, 1975, Pat. No. 3,994,372. This application Sept. 20, 1976, Ser. No. 724,444

Int. Cl.[2] B32B *1/10*; A45C *7/00*; B32B *31/20*

U.S. Cl. 156—66 5 Claims



1. A method of making a zipper bag including the steps of:

A. producing a cover subassembly comprising:

1. providing a generally rectangular cover sheet of thermoplastic material;

2. securing a rigid base board to the middle of said cover sheet;

B. producing a liner subassembly comprising:

1. providing a liner sheet of thermoplastic material;

2. securing rigid inserts adjacent the ends of said liner sheet;

C. producing a body panel by superimposing said liner subassembly with said cover subassembly on a flat surface and bonding together the edges of said liner subassembly and said cover subassembly;

D. securing one-half of two zipper means along each longitudinal edge of said body panel;

E. producing two end panels by consolidating two multilayer assemblies each comprising a rigid insert between a cover sheet and a liner sheet and bonding the edges of said sheets together;

F. securing a corresponding half of each of said two zipper means about the circumference of each of said end panels; and,

G. connecting each of said end panels to the edges of said body panel by fastening together each of the corresponding zipper halves.

4,059,465

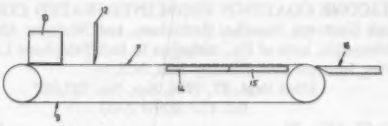
METHOD OF FORMING CARPET TILES

John B. Edgar, 9 Eastwood Ave., Giffnock, Glasgow, and Peter W. Bell, 66 Lomond Crescent, Beith, both of Scotland

Filed Jan. 9, 1973, Ser. No. 322,158

Int. Cl.[2] B32B *5/02*

U.S. Cl. 156—72 3 Claims



1. A method of forming carpet tiles comprising the steps of doctoring a layer of predetermined thickness of thermo-plastics material onto a carrier sheet, laying a piece of carpeting to be coated on said layer, the carpet piece being dimensionally only slightly larger than the desired carpet tile, applying heat to said layer so as to bond the layer of thermo-plastics material to said carpet piece, cooling the bonded layer and carpet piece so as to form a coated carpet piece, stripping the carrier sheet from the coated carpet piece and trimming waste from the periphery of the bonded carpet piece so as to form a carpet tile, and supporting the carrier sheet on a substantially flat surface during said heating and cooling steps whereby the carpet piece is maintained in a substantially flat and relaxed condition and the warps and wefts of the carpet piece do not support the weight of the carpet piece.

4,059,466

HOT MELT THERMOPLASTIC ADHESIVE FOAM SYSTEM

Charles H. Scholl, Vermilion; John R. Janner, Jr., Lorain; William C. Stumphauzer, Elyria, and Duane O. Shuster, Avon Lake, all of Ohio, assignors to Nordson Corporation, Amherst, Ohio

Filed Aug. 2, 1976, Ser. No. 710,378

Int. Cl.[2] B32B *5/18*

U.S. Cl. 156—78 14 Claims

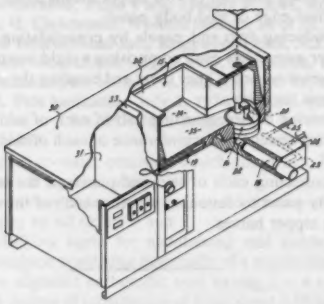
1. The method of bonding with a hot melt thermoplastic adhesive foam which comprises,

heating solid thermoplastic adhesive and a blowing agent so as to create a gaseous containing hot melt adhesive in a liquid state,

pressurizing the mixture of liquid and gas so as to force the gas into solution with the liquid adhesive,

dispensing the liquid and gas solution at a pressure less than the solution maintenance pressure of said gas and adhesive

solution whereby said gas is released from solution and forms a hot adhesive foam, and



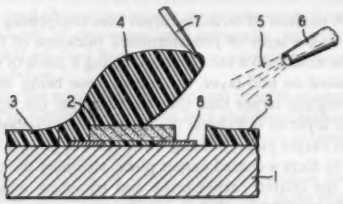
compressing said hot adhesive foam between two substrates to force gas from the foam and to form a bond between said substrates.

4,059,467

METHOD FOR REMOVAL OF ELASTOMERIC SILICONE COATINGS FROM INTEGRATED CIRCUITS

Ralph Gustavus Mancke, Bethlehem, and Nicholas Alec Soos, Macungie, both of Pa., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sept. 27, 1976, Ser. No. 727,057
Int. Cl.² B29B 3/00
U.S. Cl. 156—80 **8 Claims**



1. In the fabrication of circuits on an insulating substrate, a method for removal of cured elastomeric encapsulants having a greater adhesive strength than cohesive strength from said substrate comprising the steps of:

defining the region of encapsulant to be removed by cutting through said encapsulant at the boundaries of said region;

cooling the region of said encapsulant such that the cohesive strength of the encapsulant becomes greater than its adhesive strength; and

peeling off the encapsulant in said region.

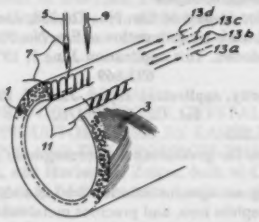
4,059,468

METHOD OF MANUFACTURE OF PARTS OF THREE-DIMENSIONAL FABRICS

Bernard Bouillon, Nozay, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed Feb. 1, 1977, Ser. No. 764,654
Claims priority, application France, Feb. 3, 1976, 76.02943
Int. Cl.² B32B 7/08
U.S. Cl. 156—93 **8 Claims**

1. A method of manufacture of parts of three-dimensional fabrics of the type which consists in successively stacking layers of bidimensional fabrics or layers of parallel threads extending alternately from one layer to the next in a first direction and in a second direction, and sewing the stack thus formed in parallel lines by means of a thread which extends in a third direction, wherein said layers are stacked on a support of pyrolyzable material, wherein the stack of said layers and said support are sewn by means of the thread which extends in the third direction and wherein the assembly thus obtained is subjected to a temperature within the range of 800° C to 1200°



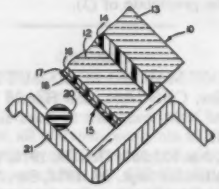
C in the presence of a stream of gaseous hydrocarbon in order to pyrolyze the material which constitutes said support and in order to deposit pyrolytic graphite or carbon on the threads which form said three-dimensional fabric.

4,059,469

GLAZING UNITS, METHODS OF MAKING THE SAME AND ADHESION PROMOTERS THEREFOR

Paul T. Mattimoe, Toledo; Theodore J. Motter, Genoa; John J. Hofmann, and Siegfried H. Herliczek, both of Toledo, all of Ohio, assignors to Libbey-Owens-Ford Company, Toledo, Ohio

Continuation-in-part of Ser. No. 438,659, Feb. 1, 1974, abandoned, which is a continuation-in-part of Ser. No. 284,137, Aug. 28, 1972, abandoned. This application Jan. 5, 1976, Ser. No. 646,464
Int. Cl.² B32B 9/04, 13/04
U.S. Cl. 156—108 **11 Claims**



1. A transparent, temperature stable, glazing structure for automobiles that is free of apparent distortion and birefringence color; comprising the combination, with a surface of glass that is to become the inboard glass surface when said glazing structure is mounted in an automobile, of a relatively soft and extensible penetration resistant protective plastic cover on said surface that includes a layer of relatively high adhesion plastic selected from the group consisting of polyvinyl butyral, ionomer resin, polyurethane and polyvinyl chloride, heat and pressure laminated to said inboard glass surface of said structure, a more durable layer of stretched plastic selected from the group consisting of polyethylene terephthalate, polyurethane, cellulose triacetate, fluorinated copolymers of ethylene and propylene, copolymers of acrylic acid esters, and polyvinyl fluoride arranged with its major axis of stretch at right angles to the horizontal dimension of said glazing structure on said relatively high adhesion plastic layer, and a relatively harder abrasion resistant coating layer ½ to 14 mils thick selected from the group consisting of (a) mixtures of polysilicic acid and copolymers of fluorinated monomers with compounds containing alcohol groups, (b) hydrolysis and condensation products of methyltriethoxy silane and (c) a mixture of hydrolysis and condensation products of methyltriethoxy silane and polysilicic acid on said more durable layer of

stretched plastic; and an adhesion promoter comprising a solution of a reaction product of a film forming resin with a compound capable of hydrolysis followed by condensation on a surface of one of said last mentioned layers.

4,059,470

APPARATUS AND METHOD FOR TRANSFERRING A MATERIAL FROM A CARRIER MEANS TO A SHEET MEANS

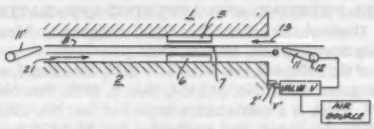
Otto Hubert Jan Primavesi, Offenbach am Main, Germany, and Alexander Primavesi, deceased, late of Offenbach am Main, Germany (by Dagmar Charlotte Primavesi, legal representative), assignors to J. Bobst et Fils S.A., Switzerland

Continuation-in-part of Ser. No. 693,624, Dec. 26, 1967, abandoned. This application Mar. 10, 1972, Ser. No. 233,638

Claims priority, application Switzerland, Dec. 27, 1966, 18789/66

Int. Cl.[2] B44C *1/00*

U.S. Cl. 156—238 6 Claims



1. An apparatus for transferring material from one member to another comprising:

first and second means relatively reciprocable towards each other to clamp said members therebetween and effect transfers of said material from said one member to the other in sequential operations, and

separating means including means to inject a hot gaseous fluid between said members after each transfer and including means to heat said fluid.

4,059,471

TRANSFER DYEING OF PLASTIC SURFACES WHICH MAY BE COMBINED WITH LAMINATION OR MOLDING PROCEDURES

John M. Haigh, 102 Bay View Ave., Salem, Mass.

Filed Jan. 13, 1975, Ser. No. 540,383

The portion of the term of this patent subsequent to Jan. 14, 1992, has been disclaimed.

Int. Cl.[2] B29C *5/06;* B32B *31/12;* B41C *1/06;* D06P *1/16*

U.S. Cl. 156—244 19 Claims

1. A method for transferring dye patterns to dye receptor plastic web comprising, interposing a polyolefin carrier web between a transfer web containing dispersed dyes and said dye receptor plastic web, pressing said webs together to obtain close contact therebetween; heating the pressed webs to a sublimation temperature for the dyes; maintaining said webs at said temperature until a substantial portion of said dyes have sublimed and transferred through said polyolefin web to said dye receptor web; cooling said webs below the softening temperature of the dye receptor web and separating the dye receptor web from the other webs.

7. A method for dye transfer and lamination of webs comprising interposing a polyolefin dye carrier web between a transfer web containing dispersed dyes and a plastic dye receptor web; placing a laminating web adjacent said dye receptor web on the reverse side thereof; pressing all of said webs together at a laminate pressure for said dye receptor web and said laminating web; heating the pressed webs to a sufficient temperature for sublimation of said dyes and for lamination of said dye receptor web and said laminating web, cooling the pressed materials to complete said lamination, releasing said pressure and separating the resulting laminate of dye receptor web and laminating web from the dye transfer web and the polyolefin carrier web.

15. A method for in-mold dye penetration and decorating of plastic articles comprising placing a dye transfer web, a polyolefin dye carrier web and a dye receptor web in said mold such that the dye carrier web is between the other webs, closing the mold, applying sufficient heat and pressure to force said dye receptor web into close contact with said dye carrier web and any adjacent mold walls, said heat being also sufficient to cause the dyes in the dye transfer web to sublime through said dye carrier web to penetrate and decorate the adjacent surfaces of said dye receptor web, to thus mold and decorate a plastic article, cooling said article below its softening point and opening said mold to eject the molded and decorated article.

4,059,472

COATED PRODUCTS

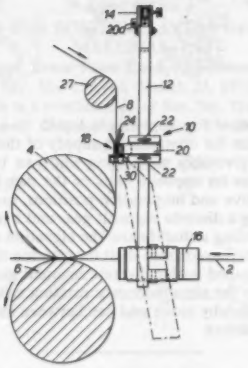
Ralph G. Timms, Wirral, England, assignor to British Steel Corporation, London, England

Filed Apr. 19, 1976, Ser. No. 677,867

Claims priority, application United Kingdom, Apr. 30, 1975, 18018/75

Int. Cl.[2] B32B *31/00;* B26D *5/00, 5/38*

U.S. Cl. 156—259 20 Claims



1. A method for producing coated strip by continuously applying a film of the coating to the moving strip and trimming at least one edge of the film before it makes contact with the strip by means which are responsive to the position of the adjacent strip edge.

4,059,473

PRIMER COMPOSITIONS

Takehide Okami, Annaka, Japan, assignor to Shin-Etsu Chemical Company Limited, Tokyo, Japan

Filed May 25, 1976, Ser. No. 689,913

Claims priority, application Japan, May 29, 1975, 50-64762

Int. Cl.[2] C09J *5/02*

U.S. Cl. 156—308 10 Claims

9. A method for adhesively bonding a room-temperature-curing silicone rubber elastomer to a substrate which comprises applying to the surface of the substrate a primer composition consisting essentially of (1) 2 to 98 parts by weight of a mercapto-containing organosilane or organopolysiloxane represented by the average unit formula

$$(HS-E^1)_a(R^2)_b(X)_cSiO_{\frac{4-a-b-c}{2}}$$

where R^1 is an alkylene group having 1 to 4 carbon atoms, R^2 is a substituted or unsubstituted monovalent hydrocarbon group, X is a hydroxy or hydrolyzable atom or group and a, b, and c have values as expressed by $0<a\leqq 1$. $0\leqq b\leqq 1$ and $0<c\leqq 3$, respectively, with the proviso that $a=b=c$ has the value as expressed by $0<(a+b+c\leqq 4$ and (2) 98 to 2 parts by

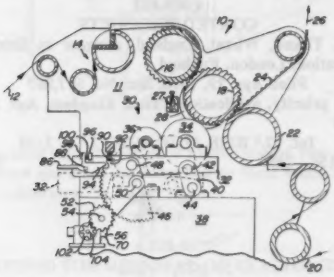
weight of a titanic acid ester, contacting the uncured elastomer with the thus primed surface, and subjecting the thus contacted elastomer to curing conditions.

4,059,474

GLUE MECHANISM

Robert E. Coburn, Warminster, Pa., assignor to Molins Machine Company Inc., Cherry Hill, N.J.

Filed May 10, 1976, Ser. No. 684,607
Int. Cl.² B05C *1/08*; B31F *1/28*
U.S. Cl. 156—356 **15 Claims**



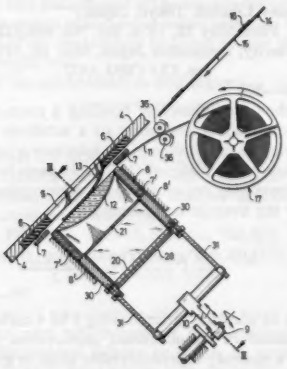
1. A mechanism for applying a liquid to a moving web comprising a pan for containing a supply of the liquid, a support structure pivotably supporting said pan by a parallelogram link means on opposite ends of the pan for movement between operative and inoperative positions, each of said link means including a discrete segment gear and a link, and actuator means including a shaft below the elevation of said mechanism, a pair of pinions on said shaft for rotation therewith, each pinion being meshed with a discrete segment gear on opposite ends of the pan for simultaneously rotating said discrete segment gears to thereby move said pan between its operative and inoperative positions.

4,059,475

COMBINED MOUNTING AND PROJECTION APPARATUS FOR APERTURE CARDS

Wolfram Gernhardt, Tubingen; Gerhard Meier-Maletz, Wiesbaden-Biebrich, and Heinz Zeutschel, Tubingen, all of Germany, assignors to Hoechst Aktiengesellschaft, Germany

Filed Mar. 18, 1975, Ser. No. 559,537
Claims priority, application Germany, Mar. 20, 1974, 2413368
Int. Cl.² B32B *31/00*; B26D *7/00*; G03B *21/00*
U.S. Cl. 156—379 **3 Claims**



1. A mounting apparatus for aperture cards comprising cutting means for severing individual filmed images from a strip of film, said cutting means including a knife unit and a counter-knife unit, said knife unit being part of a plunger means having an edge facing the filmed image, and said plunger means serving to first sever and then to press the severed filmed image upon a mounting card,

resilient counter-pressure frame means mounted opposite said plunger means,

projection means including a light source, a condenser lens and an objective lens, forming an optical path, an opening in said plunger means positioned in said path,

said condenser lens having a flat surface and being mounted in a portion of the plunger means facing the filmed image, the edge of the plunger means facing the filmed image being flush with said flat surface of said condenser lens,

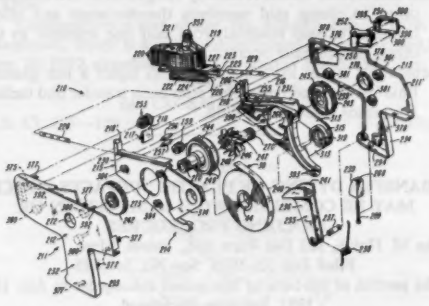
whereby said flat surface and said edge of said plunger together form a pressing means for the filmed image.

4,059,476

LABEL PRINTING AND APPLYING APPARATUS

Paul H. Hamisch, Jr., Franklin, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio

Division of Ser. No. 449,111, March 7, 1974, abandoned, which is a division of Ser. No. 312,454, Dec. 6, 1972, Pat. No. 3,968,745, which is a continuation-in-part of Ser. No. 208,035, Dec. 8, 1971, abandoned. This application Jan. 23, 1976, Ser. No. 651,750
Int. Cl.² B41F *1/02*
U.S. Cl. 156—384 **5 Claims**



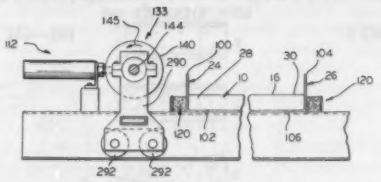
1. A hand-held label printing and applying machine for printing and applying pressure sensitive labels carried on a web of supporting material, comprising: a housing having a handle and a first arcuate bearing surface, printing means, a delaminator downstream of the printing means, feeding means engageable with the web downstream of the delaminator for drawing the web to effect delamination of labels by the delaminator, an applicator for applying the labels, means including an actuator disposed at the handle and movable away from and toward an initial position for operating the printing and feeding means in sequence, the actuator having a second arcuate bearing surface, and a spring assembly disposed in the housing and comprising a sleeve, a plunger slidably received in the sleeve and a captive spring disposed within the sleeve and acting on the sleeve and on the plunger for exerting forces on both the handle and the actuator to effect return of the actuator to its initial position, and means for limiting the extent to which the sleeve and plunger can move apart to prevent the parts from separating and releasing the spring during assembly or disassembly of the machine, the limiting means including a snap-lock connection including a resilient member, wherein one of the sleeve and the plunger has an integrally formed bearing surface cooperable with the first bearing surface and the other of the sleeve and the plunger has an integrally formed bearing surface cooperable with second bearing surface.

4,059,477

BOX END LABELING APPARATUS

John George Wesley, Forest Park, Ill., assignor to Labelette Company, Forest Park, Ill.

Filed May 26, 1976, Ser. No. 690,259
Int. Cl.[2] B32B *3/04*
U.S. Cl. 156—479 4 Claims



1. A machine for simultaneously overlabeling both ends of a box of parallelipiped configuration, said machine comprising:

a processing way having entrance and exit ends,

means for conveying the box to be labeled longitudinally of said way including means for disposing the box to extend transversely of said way whereby the box ends project to either side of said conveying means,

said way including a labeling station and a label folding station in spaced apart relation therealong,

a label supply station for each box end and means for feeding a label from the respective label supply stations to said labeling station,

said label supply stations and said label feeding means for each box end being located relative to said conveying means to dispose the labels for each box end to have one end of same projecting toward the way and underlying the path of movement that the box end to be labeled thereby has when the box is moved along said way by said conveying means, and to have the other end of same project laterally of said way and said path endwise of the box end and away from said way and beyond said path, whereby the labels for each box end extend transversely of said way,

said labeling station including means for applying glue to the underside of the respective labels when received from said label supply station and means for rolling the respective said one ends of the respective labels onto the underside of the box at either end of same as the box is moved through said labeling station,

said label folding station including means for consecutively wiping the respective labels flush against said box ends for adhering same thereto, and for wiping the labels flush against the top side of the box for adhering same thereto,

said means for wiping the respective labels flush against said box ends comprising for each box end comprising:

a vertically movable wiping member mounted for reciprocating movement between a retracted position below the level of said paths to an elevated position projecting above the level of said paths,

said label folding station further including for each wiping member a generally planar pressure panel disposed vertically and paralleling said way,

said panels being respectively mounted and positioned in vertical alignment with and beneath the respective paths of movement of the respective box ends and defining rectilinear top edges horizontally disposed and substantially aligned with the level of the underside of the box when the box is positioned at said label folding station between said panels,

said wiping members each including a resiliently compressible pad defining a sliding wiping surface disposed to bear compressively against the respective panels when said wiping members are in their retracted positions, and to bear compressively against the respective box ends when said wiping members are in their elevated positions,

means for moving said wiping members between their said positions for slide wiping the respective labels flush against said box ends when the box is at said label folding station,

means for holding the box that is at said label folding station against vertical movement on movement of said wiping members to their said elevated positions,

said means for wiping the respective labels flush against the top side of the respective boxes at said label folding station comprising for each box end to be labeled:

a horizontally movable roller mounted for reciprocating movement in a plane level with the level of the top sides of the boxes, as they are disposed along the path of movement of the respective box ends, between a retracted position to one side of the way and an extended position overlying the way wherein said rollers ride on the top sides of the respective boxes when at said label folding station,

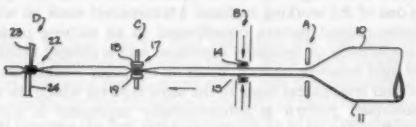
and means for reciprocating said rollers between said positions for wiping the respective labels against the top sides of the respective boxes.

4,059,478

APPARATUS FOR BONDING LAYERS OF RESINOUS MATERIAL

Louis S. Hoffman, Evans Farm Road, Morristown, N.J. 07960

Division of Ser. No. 457,714, March 25, 1974, Pat. No. 3,956,045, which is a continuation of Ser. No. 210,523, Dec. 21, 1971, abandoned. This application Mar. 10, 1976, Ser. No. 665,723
Int. Cl.[2] B32B *31/00*
U.S. Cl. 156—510 10 Claims



1. Apparatus for bonding adjacent portions of films of polyester resinous material to one another by means of at least one layer of polyester resinous material adjacent thereto comprising:

a. first means for supporting and advancing at least two films of polyester resinous material to be bonded to one another at a predetermined location, a portion of one surface of one film of polyester resinous material being supported contiguous with a portion of one surface of the other film of polyester resinous material for forming an interface between the contiguous portions,

said first means advancing said two films of polyester resinous material intermittently to said predetermined location at which said two films are to be bonded,

b. second means for supporting and advancing at least one layer of polyester resinous material adjacent the other surface of at least one of the films of polyester resinous material with a portion of the layer being contiguous with the other surface,

said second means being disposed adjacent to said predetermined location for advancing a web of polyester resinous material from a source thereof and across the portions of the films to be bonded to one another, the web of polyester resinous material forming said layer of resinous material,

said second means advancing said web of polyester resinous material along a line at which said two films are to be bonded, said second means advancing said web of polyester resinous material in synchronism with said first means, thereby placing said web at said predetermined location during the intermittent placement of said two films to be bonded at that location,

c. means for compressing the contiguous portions of the

films of polyester resinous material and the contiguous portion of each layer of polyester resinous material against one another, and

d. means for applying energy through at least one layer of polyester resinous material to the contiguous portions of the films of polyester resinous material sufficient to bond the films of polyester resinous material to one another, the energy being applied while the two films are compressed by the compressing means.

4,059,479

METHOD OF FORMING AN EMBOSSED PATTERN

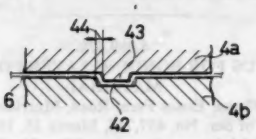
Hisaji Tanazawa, 8-4 Hanazono Higashimachi 1-chome, Higashi, Osaka, Japan

Continuation of Ser. No. 433,472, Jan. 15, 1974, abandoned. This application July 1, 1976, Ser. No. 701,998

Claims priority, application Japan, Aug. 10, 1973, 48-90436

Int. Cl.² C23F *1/02*

U.S. Cl. 156—640 **1 Claim**



1. A method of forming an embossing pattern which is comprised of providing on one of a pair of working surfaces, a soluble light sensitive coating which turns insoluble under exposure, while on the other, providing an insoluble light sensitive coating which turns soluble under exposure placing on one of the working surfaces, a transparent mask on which a predetermined pattern coordinated to an etching pattern is transparently or opaquely expressed and is closely fitted onto the light sensitive coating, while on the other working surface, another transparent mask of the same type on which the aforementioned pattern is symmetrically expressed is similarly closely fitted; then, exposing each working surface such that on one working surface, the pattern coordinated to that to be embossed is drawn positive with an acid-resistant coating, while on the other working surface, another pattern symmetrical and identical in size to the aforementioned pattern is drawn negative, thereafter, both working surfaces are subjected respectively to an etching treatment, thereby forming a concavity and a convexity corresponding to the patterns of the acid-resistant coatings, while etching treatment is applied such that a predetermined etching is produced on the sides of the concavity and the convexity, so that an appropriate clearance may be formed between the side surfaces of the said coordinated concavity and convexity.

4,059,480

METHOD OF FORMING VIADUCTS IN SEMICONDUCTOR MATERIAL

Wolf-Dieter Ruh, and Gerhard Trippel, both of Sindelfingen, Germany, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sept. 29, 1976, Ser. No. 727,831

Claims priority, application Germany, Feb. 9, 1976, 2604939

Int. Cl.² B23P *15/00, 25/06;* B44C *1/22*

U.S. Cl. 156—644 **12 Claims**

1. A method of forming viaducts in semiconductor devices consisting of two layers by forming the viaducts in said two layers successively, and

said semiconductor devices are characterized by

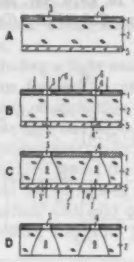
a first layer comprising a material that is impervious to radiation of a predetermined wavelength range, and a second layer comprising a material that is pervious to that radiation,

further comprising the steps of

forming a viaduct in said first layer,

coating the outer side of said second layer with positive working photoresist,

exposing said photoresist through said viaduct in said first



layer for forming an aperture in said coating aligned with the viaduct in said first layer, and

etching the viaduct in said second layer through said aperture formed in said exposed photoresist.

4,059,481

METHOD OF MAKING AN INTAGLIO HALFTONE GRAVURE PRINTING PLATE

Katsusuke Nagano, Mitaka, Japan, assignor to Dai Nippon Insatsu Kabushiki Kaisha, Tokyo, Japan

Filed July 12, 1976, Ser. No. 704,405

Claims priority, application Japan, July 14, 1975, 50-85993; Mar. 22, 1976, 51-31011

Int. Cl.² G03F *7/02*

U.S. Cl. 156—660 **12 Claims**

1. A method of making an intaglio halftone gravure printing plate comprising the steps of:

contact-printing onto a sensitized carbon tissue a contact screen including a grid-like arrangement of minute dark dots each having the shape of a square rounded off at the four corners with a vignetted periphery and having densities tapering from a maximum value of 3.0 at the central part to a minimum value of 0.1 at the periphery;

contact-printing in registration a halftone positive onto the carbon tissue;

superposing a light diffusion sheet and the halftone positive on the carbon tissue in the order named, and contact-printing in registration the light diffusion sheet and the halftone positive combinedly onto the carbon tissue;

said steps being carried out in any desired order;

applying the thus treated carbon tissue to a printing plate to develop the tissue thereon; and

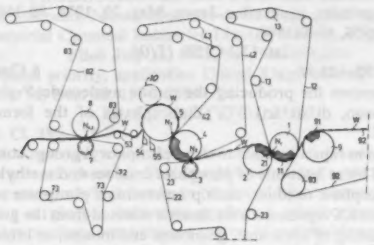
etching the printing plate to obtain the halftone gravure printing plate.

4,059,482

PAPER MACHINE PICKUP AND CREPE-SETTING PRESS SECTION

Matti Kankaanpää, Espoo, Finland; Ragnar Nylund, Taby, Sweden, and Yrjo Reijonen, Jyvaskyla, Finland, assignors to Valmet Oy, Finland

Filed Sept. 24, 1975, Ser. No. 616,244
Claims priority, application Finland, Sept. 27, 1974, 742844
Int. Cl.[2] D21F *3/04*
U.S. Cl. 162—281 8 Claims



1. In a pickup and press section of a paper machine, suction pickup roll and felt means for transferring a web away from a wire while supporting the web during transfer thereof, first suction press roll and felt means situated next to said suction pickup roll and felt means and defining therewith a first press nip to which the web is transferred by said suction pickup roll and felt means while being continuously supported thereby, second suction press roll and felt means and a lower roll and felt means situated next to said second suction press roll and felt means for defining therewith a second press nip, said lower roll of said lower roll and felt means at said second press nip having a recessed exterior surface and said felt means of said lower roll and felt means at said second press nip and said first suction press roll and felt means at said press nip being formed by a felt common to said first suction press roll and said lower roll at said second press nip, and said common felt supporting the web as it travels beyond said first press nip to said second press nip, first plain press roll means situated next to said second suction press roll and felt means and defining therewith a third press nip, said second suction press roll and felt means transferring the web beyond said second press nip to said third press nip while continuously supporting the web, whereby the web after being picked up by said suction pickup roll and felt means travels with closed conduction through at least three press nips the first two of which are double-felted while the third is single-felted, thus avoiding open draw of the web at least up to said third press nip, and conveyor means formed in part by said first plain press roll means for conveying the web beyond said third press nip along a predetermined path away from said third press nip, said conveyor means including a pair of additional rolls situated along said predetermined path beyond said first plain roll means of said third press nip and a felt cooperating with one of said additional rolls and defining with the other of said additional rolls a crepe-setting press nip to which the web travels along said predetermined path when conveyed beyond said first plain press roll means of said third press nip, said conveyor means including a second plain roll means situated next to said first plain roll means of said third press nip and defining with said first plain roll means a fourth press nip to which the web is conveyed by said first plain roll means while travelling beyond said third nip and while continuously supported by said first plain roll means, so that the web first travels through and beyond said fourth press nip before travelling along said predetermined path to said pair of additional rolls, and creping doctor means cooperating with said first plain press roll means subsequent to said fourth press nip for providing a creped web travelling along said predetermined path to said crepe-setting press nip where crepe-setting is performed by said pair of additional rolls and said felt cooperating with one of said additional rolls.

4,059,483

NUCLEAR FUEL ASSEMBLY SEISMIC AMPLITUDE LIMITER

Andrew J. Anthony, Tariffville, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Dec. 5, 1975, Ser. No. 637,983
Int. Cl.[2] G21C *3/30*
U.S. Cl. 176—78 14 Claims

1. In a nuclear reactor fuel assembly, the fuel assembly including a plurality of zircaloy spacer grids which locate and support elongated fuel elements which pass therethrough, said fuel assembly further including a plurality of guide tubes which extend through the fuel assembly parallelly of the fuel elements and which receive movable neutron absorber elements, the improvement comprising:

at least a first seismic grid positioned intermediate a pair of spacer grids, said seismic grid having a greater resistance to deformation when compared to the spacer grids and having larger external dimensions than said spacer grids, said seismic grid including:

a steel perimeter strip, said perimeter strip defining the exterior dimensions of said seismic grid, said perimeter strip being provided with a plurality of openings and a plurality of inwardly extending projections;

a plurality of divider members, said divider members being mechanically coupled to said perimeter strip and being arranged in a crossing pattern to define a plurality of grid sectors, said grid sectors being dimensioned so as to present fuel element motion limiting surfaces on said divider members and perimeter strip normally spaced from and out of contact with fuel elements passing through said seismic grid; and

means attaching some of said divider members to the guide tubes to support said seismic grid on the fuel assembly.

4,059,484

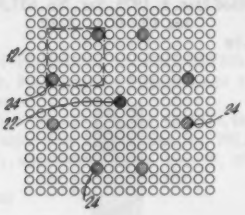
HYBRID NUCLEAR FUEL ASSEMBLY WITH REDUCED LINEAR HEAT GENERATION RATES

Lamar P. Bupp, Kirkland, and George A. Sofer, Richland, both of Wash., assignors to Exxon Nuclear Company, Inc., Bellevue, Wash.

Filed May 2, 1975, Ser. No. 573,864
Int. Cl.[2] G21C *3/30*
U.S. Cl. 176—78 10 Claims

1. A hybrid fuel assembly to reduce the maximum and aver-

age linear heat generation rates for use in a nuclear reactor having a plurality of control rods comprising a plurality of elongated fuel rods disposed in spaced parallel array, said fuel rods including a first plurality of said fuel rods having a first diameter and a second plurality of said fuel rods having a second diameter greater than said first diameter, said first plurality of fuel rods includes a first fuel enrichment and said second plurality of fuel rods includes a second fuel enrichment



different from said first fuel enrichment, said second plurality of fuel rods being divided into clusters of fuel rods forming islands, said islands including guide tubes having diameters substantially the same as said second plurality of fuel rods, one guide tube corresponding to each of said control rods, said islands located within said assembly so that said guide tubes may receive all of said control rods, said islands being symmetrically located relative to the intersecting diagonal centerlines of said fuel assembly.

4,059,485

ADAPTATION OF CELL LINES TO SUSPENSION CULTURE

William R. Tolbert, Manchester, and Joseph Feder, University City, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Nov. 3, 1976, Ser. No. 738,515
Int. Cl.[2] C12K *9/00*
U.S. Cl. 195—1.8 **12 Claims**

1. A method of rapidly adapting normally anchorage-dependent established cell lines to agitated liquid suspension culture comprising growing an inoculum of said cell line in substrate-attached culture to a stage beyond that of ordinary monolayer growth whereby multilayers of cells are produced, releasing the cells from the substrate-attached culture in the form of cell aggregates ranging from about 20 microns to about 500 microns in diameter, transferring said aggregates into a liquid suspension of nutrient culture medium of known essential amino acids, mineral salts, vitamins and carbohydrates, incubating at a temperature of from about 30° C to about 38° C while substantially continuously maintaining agitation of said medium, periodically transferring the growing cells into fresh nutrient medium and continuing the agitated incubation whereby said cells continue to be proliferated in aggregates.

4,059,486

CELL CULTURE PROCESS

William R. Tolbert, Manchester, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Nov. 3, 1976, Ser. No. 738,513
Int. Cl.[2] C12K *9/00*
U.S. Cl. 195—1.8 **10 Claims**

1. A method of rapidly propagating SV3T3 cells in vitro to elaborate MIF and TAF comprising growing SV3T3 cells on a surface, thereafter transferring an inoculum of said growing cells into a normally liquid suspension of nutrient culture medium of known essential amino acids, mineral salts, vitamins, and carbohydrates, incubating at a temperature of from about 30° to about 38° C while substantially continuously maintaining agitation of said medium, periodically transferring the growing cells into fresh nutrient culture medium and continuing the agitated incubation until harvest whereby said cells are proliferated in aggregates and elaborate MIF and TAF in significantly detectable amounts.

4,059,487

PURINE NUCLEOSIDE 5'-PHOSPHATE(MONO, DI OR TRI)3'(2')-DIPHOSPHATES AND PROCESSES FOR THEIR PREPARATION

Toyokazu Nishino, Hikisokita; Yasutaro Hamagishi, Sakai; Toshikazu Oki, Kamakura, and Sawao Murao, Sakai, all of Japan, assignors to Sanraku-Ocean Co., Ltd., Tokyo, Japan

Filed Mar. 18, 1975, Ser. No. 559,462
Claims priority, application Japan, Mar. 29, 1974, 49-34625; Dec. 16, 1974, 49-143546
Int. Cl.[2] C12D *13/06*
U.S. Cl. 195—28 N **6 Claims**

1. A process for producing the purine nucleoside 5'-phosphate (mono, di or tri) 3'(2')-diphosphates of the formula mXpp,

wherein m represents one to three phosphoryl groups constituted by at least one of phosphate residues and methylene diphosphate residues, each p represents a phosphate residue and X represents a nucleoside selected from the group consisting of adenosine, guanosine and inosine, or lithium, potassium or sodium salts thereof which comprises placing a donor nucleotide or deoxynucleotide and an acceptor nucleotide in contact with a pyrophosphotransferase produced by an actinomycetes belonging to the genera Streptomyces, Streptoverticillium or Actinomyces, and characterized by a substrate specificity for a nucleotide or a deoxynucleotide as a donor and a nucleotide as an acceptor and the capability of transferring a pyrophosphoryl group from the 5'-position of said donor nucleotide or deoxynucleotide to the 3'(2') position of said acceptor nucleotide, incubating the resultant reaction mixture to effect the transfer of a pyrophosphoryl group of the 50'-position of said donor nucleotide or deoxynucleotide to the 3'(2')-position of said acceptor nucleotide and recovering the thus obtained purine nucleoside 5'-phosphate(-mono, di or tri) 3'(2')-diphosphate or salts thereof.

4,059,488

METHOD OF PRODUCING LONG-CHAIN ALPHA-HYDROXYALKANOIC ACIDS

Kazumasa Hachikubo, Toda, and Shuzo Suzuki, Sayama, both of Japan, assignors to Bio Research Center, Co., Ltd., Tokyo, Japan

Filed June 8, 1976, Ser. No. 693,852
Claims priority, application Japan, June 20, 1975, 50-76123
Int. Cl.[2] C12D *1/02*; C12K *3/00*
U.S. Cl. 195—28 R **3 Claims**

1. A method of producing a long-chain alpha-hydroxyalkanoic acid from an alpha olefin having from 10 to 18 carbon atoms which comprises:

a. adapting a microorganism of the *Candida lipolytica* species to assimilate said alpha olefin and to produce said acid as the major metabolite of said assimilation by

1. first cultivating said microorganism in an aqueous nutrient medium containing a hydrocarbon boiling in the kerosene range to obtain a culture of said microorganism,

2. then cultivating said culture in a second separate aqueous nutrient medium containing an alpha having from 10 to 18 carbon atoms to obtain a second separate microorganism culture,

3. repeating in separate successive cultivation steps the cultivation of step (2), starting with said second separate microorganism culture as inoculum in the first of the successive cultivation steps and utilizing as inoculum in succeeding cultivation steps the microorganism culture obtained in the next preceding cultivation step, until there is obtained a final microorganism culture capable

of producing said acid as the major metabolite of said alpha olefin assimilation;

b. then cultivating in an aqueous nutrient medium containing an alpha olefin having from 10 to 18 carbons said final microorganism culture from step(a)(3); and

c. recovering from cultivation step(b) an alphahydroxycarboxylic acid having the same number of carbon atoms as said alpha olefin.

4,059,489

PRODUCTION OF GLUCOSE ISOMERASE

John Laurence Meers, Stockton-on-Tees, England, assignor to Imperial Chemical Industries Limited, London, England

Filed July 11, 1975, Ser. No. 595,316

Claims priority, application United Kingdom, July 30, 1974, 33578/74; Dec. 30, 1974, 55994/74

Int. Cl.² C12D *13/02, 13/10*

U.S. Cl. 195—31 F **15 Claims**

11. A process which comprises isomerizing glucose to fructose wherein there is added in said isomerizing a glucose isomerase enzyme which has been produced by continuously cultivating a glucose isomerase-producing microorganism in a culture medium comprising a source of assimilable carbon and inorganic nutrients under conditions suitable for production of said enzyme and continuously recovering said enzyme wherein the concentration of a nutrient source in the culture medium is maintained at a level such as to be limiting to growth.

4,059,490

MEASUREMENT OF ALKALINE PHOSPHATASE LEVELS IN BODY FLUIDS

Barry Clifford Axcell, Johannesburg, and Cyril Donninger, Sandton, both of South Africa, assignors to Chembro Holdings (Proprietary) Limited, Johannesburg, South Africa

Filed Sept. 10, 1976, Ser. No. 722,240

Claims priority, application South Africa, Sept. 22, 1975, 75/6003

Int. Cl.² G01N *31/14, 33/00*

U.S. Cl. 195—99 **15 Claims**

1. A method of measuring the alkaline phosphatase level in a body fluid comprising hydrolysing excess monophosphate ester dissolved in a suitable buffer by action of the alkaline phosphatase in a predetermined volume of the body fluid to yield an oxidisable substrate, said ester being a catechol monophosphate ester which may have one or more ring substituents, oxidizing the substrate with excess molecular oxygen in the presence of excess oxygenase and measuring the rate of oxygen comsumption.

4,059,491

DILUENTS FOR RUBELLA VIRUS HEMAGGLUTINATION-INHIBITION TEST

Susumu Iwasa, Kyoto, and Isamu Yoshida, Takatsuki, both of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Jan. 31, 1977, Ser. No. 764,058

Claims priority, application Japan, Feb. 2, 1976, 51-10474

Int. Cl.² G01N *33/16;* **C12K** *1/04*

U.S. Cl. 195—103.5 A **16 Claims**

8. A method for rubella virus hemagglutination -inhibition test, which comprises admixing a test serum previously diluted with a diluent which contains N-2-hydroxyethylpiperazine-N'-2'-ethanesulfonic acid in a molar concentration from about 0.001 to about 0.01 and NaCl, the pH of which is in the range of about 6.0 to about 7.5 and which is free from calcium ion with rubella virus hemagglutinating antigen previously diluted with the said diluent and, then, admixing the resultant mixture with a suspension of erythrocytes previously diluted with a diluent which contains N-2-hydroxyethylpiperazine-N'-2'-ethanesulfonic acid in a molar concentration from about 0.01 to about 0.05, $CaCl_2$ in a molar concentration from about 0.0005 to about 0.01 and NaCl and the pH of which is in the range of about 6.0 to about 6.5 to assess agglutination or nonagglutination of the erythrocytes.

4,059,492

PROCESS FOR THE PURIFICATION OF WASTE FROM ACRYLONITRILE PRODUCTION

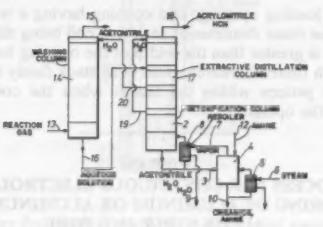
Arnold Hausweiler, Zons; Adolf Mayer, Dormagen, and Feliks Bitners, Leverkusen, all of Germany, assignors to Erdolchemie GmbH, Cologne and Bayer Aktiengesellschaft, Leverkusen, both of, Germany

Continuation-in-part of Ser. No. 544,458, Jan. 27, 1975, abandoned, which is a continuation of Ser. No. 466,350, May 2, 1974, abandoned, which is a continuation of Ser. No. 188,395, Oct. 12, 1971, abandoned. This application May 3, 1976, Ser. No. 682,555

Claims priority, application Germany, Oct. 15, 1970, 2050722

Int. Cl.² B01D *1/00, 3/34*

U.S. Cl. 203—11 **20 Claims**



1. Process for the purification of waste water from a process for preparing acrylonitrile by the gas phase oxidation of propylene and ammonia with oxygen in admisture with solid catalyst wherein water is used for the separation of acrylonitrile from the reaction mixture, said waste water being substantially free of acrylonitrile, acetonitrile and hydrogen cyanide and containing volatile and toxic and high-boiling and resinous organic compounds, which comprises:

i. treating said waste water with steam at a temperature between 100 ° and 125° C and at a pressure of from 0 to 2 atmospheres gauge, in a detoxification column containing at least 7 distribution baffles, removing volatile toxic materials as the distillate and recovering treated waste water as the bottoms product, said steam being generated in the botom of said detoxification column by indirect heating with steam produced in the following step (iv) at the rate of 0.4 to 1.0 ton of steam per ton of waste water flowing into said detoxification column;

ii. removing the so treated waste water from said detoxification column and passing it into an evaporator vessel;

iii. vaporizing a major portion of the treated waste water from the detoxification column in said evaporation vessel;

iv. recovering steam as the head product from said evaporation vessel and using said head product to generate steam in the bottom of said detoxification column by indirect heat exchange with the contents of said detoxification column, for said steam treatment; and

v. removing an aqueous solution of said organic compounds as the bottoms product from said evaporation vessel.

4,059,493

ANODE, ANODE BASKET AND METHOD OF PACKAGING ANODES

Seymour S. Rice, Southbury, Conn., assignor to Cities Service Company, Tulsa, Okla.

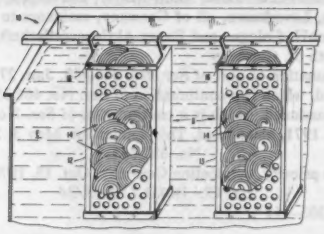
Filed Apr. 29, 1976, Ser. No. 681,622

Int. Cl.² C25D *17/10*

U.S. Cl. 204—3 **11 Claims**

1. In combination, a plurality of convolutely wound lengths of anode material formed of rod or wire, defining a plurality of

coils, said rod having a cross-section defining a predetermined configuration in at least a portion of the periphery of the cross-section, said rod being wound so that said predetermined configuration of said cross-section of each convolution of each said coil faces radially outwardly, each said coil being generally planar or flat, and a perforate anode basket having an



elongate loading opening, said opening having a width and a length, the outer diameter of each said coil being dimensioned so that it is greater than the width of the opening but less than the length thereof, whereby said coils stack freely in a predetermined pattern within the basket when the coils are fed through the opening.

4,059,494

PROCESS FOR CONTINUOUS ELECTROLYTIC COLORING OF ALUMINUM OR ALUMINUM BASE ALLOY STRIP AND WIRE

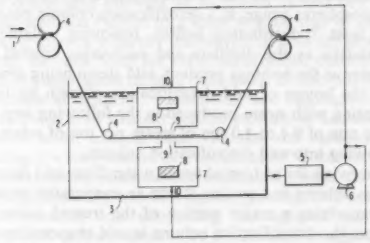
Kiyomi Yanagida; Tadashi Hirokane; Tadashi Tsukiyasu, and Tomoari Sato, all of Nagoya, Japan, assignors to Sumitomo Aluminum Smelting Co., Ltd., Osaka, Japan

Continuation of Ser. No. 633,198, Nov. 19, 1975, abandoned. This application Apr. 18, 1977, Ser. No. 788,386

Claims priority, application Japan, Nov. 19, 1974, 49-133433; Nov. 19, 1974, 49-133434

Int. Cl.² C25D *9/12*

U.S. Cl. 204—28 **5 Claims**



1. In a process for electrolytically coloring an anodically oxidized aluminum or aluminum base alloy strip or wire as a cathode in a coloring bath comprising an aqueous solution containing at least one nickel salt, cobalt salt, tin salt, iron salt, copper salt or selenious acid while continuously travelling said anodically oxidized aluminum or aluminum base allow strip or wire, the improvement which comprises subjecting said anodically oxidized aluminum or aluminum base alloy strip or wire as a cathode to direct current electrolysis using an electrolytic coloring means comprising at least one hollow body which has an anode therein, said anode being insulated from said hollow body, and has an opening of slit shape for continuously and uniformly supplying the coloring bath onto at least one surface of said strip or wire, the longitudinal direction of the slit being perpendicular to the direction of travel of said strip or wire in order that the coloring rate of said strip or wire becomes a maximum value at the portions in the vicinity of said hollow body, while continuously supplying said coloring bath onto at least one surface of said aluminum or aluminum base alloy strip or wire.

4,059,495

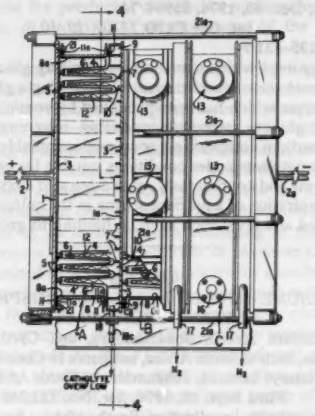
METHOD OF ELECTROLYTE FEEDING AND RECIRCULATION IN AN ELECTROLYSIS CELL

Oronzio de Nora, Milan, Italy, and Vittorio de Nora, Nassau, Bahamas, assignors to Oronzio de Nora Impianti Elettrochimici S.p.A., Milan, Italy

Continuation-in-part of Ser. No. 571,378, April 24, 1975, which is a continuation of Ser. No. 51,162, June 30, 1970, Pat. No. 3,930,980. This application June 11, 1976, Ser. No. 695,047

Int. Cl.² C25B *1/26, 1/16*

U.S. Cl. 204—98 **9 Claims**



1. The method of providing electrolyte recirculation in a diaphragm-type electrolysis cell unit having an anode compartment with a vertical hollow wave anode and anolyte therein, a cathode compartment with a vertical wave cathode therein, a diaphragm between said anode and cathode and means to pass an electrolysis current between said anode and cathode, by which a gas is evolved from the anolyte at the anode, which comprises operating the cell unit with said anolyte compartment communicating with an overhead gas receiver and brine feed container, containing feed liquor for said cell unit, by at least one vertical conduit leading from the top of the anolyte compartment to the said brine container, causing the anolyte to rise through said vertical conduit and flow into said gas receiver and brine feed container by the gas lift effect of the gas bubbles evolved at the anode and rising in both the interior of the anode waves and in the space between the anode and the cathode, and recirculating the liquid anolyte through another conduit from the said gas receiver and brine container to the anolyte compartment.

4,059,496

PROCESS FOR THE PREPARATION OF SULFURIC ACID FROM SULPHUR DIOXIDE

Rudolf Schulten, Richterich, and Friedrich Behr, Gross-Denkte, both of Germany, assignors to Rheinische Braunkohlenwerke Aktiengesellschaft, Cologne, Germany

Filed Sept. 20, 1976, Ser. No. 724,290

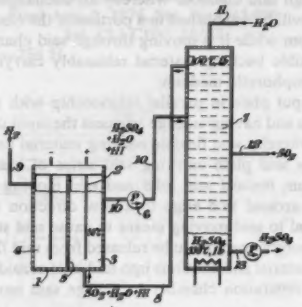
Claims priority, application Germany, Sept. 26, 1975, 2542935

Int. Cl.² C25B *1/22, 1/02*

U.S. Cl. 204—104 **3 Claims**

1. In a continuous process for the electrolytic production of sulfuric acid by oxidation of sulfur dioxide in the presence of water in an anode compartment of an electrolysis cell and of hydrogen in the cathode compartment of said cell, said cathode compartment containing aqueous sulfuric acid as catholyte

and being separated from the anode compartment by a hydrogen-ion transfer permitting membrane, the improvement which comprises continuously introducing to the anode compartment sulfur dioxide, water and a compound selected from



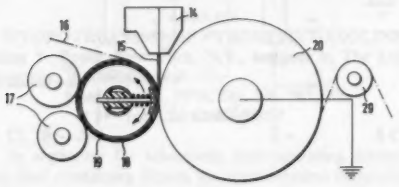
the group consisting of hydrogen iodide and iodine, removing a mixture of aqueous sulfuric acid and hydrogen iodide from the anode compartment, separating the sulfuric acid from the said mixture, and removing from the cathode compartment the hydrogen set free therein.

4,059,497

CORONA APPARATUS

Andreas Kolbe, Wiesbaden, and Peter Dinter, Hallgarten, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Dec. 10, 1976, Ser. No. 749,442
Claims priority, application Germany, Dec. 13, 1975, 2556228
Int. Cl.[2] B01K *1/00*; H01J *1/00*
U.S. Cl. 204—165 19 Claims



1. A method for the surface treatment of melts, films, foils and the like using a corona apparatus having a roller electrode assembly and a supporting surface acting as a counter electrode comprising the steps of:

a. positioning an electrode on a central shaft of said roller electrode assembly;

b. rotatably mounting a tube about said electrode and said shaft;

c. applying an alternating current voltage to said electrode; and

d. positioning said tube adjacent said counter electrode thereby forming a nib for said melts, films, foils and the like;

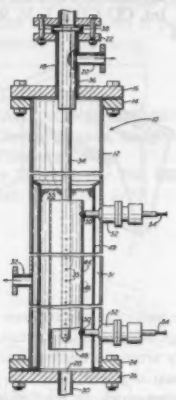
whereby said electrode produces an electric field in the region of said nib.

4,059,498

RADIAL FLOW ELECTROSTATIC FILTER

James H. Crissman, Kiskiminetas Township; G. Ray Fritsche, Bradford Woods; Frederick B. Hamel, Allison Park, and Lloyd W. Hilty, Apollo, all of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Oct. 6, 1976, Ser. No. 729,956
Int. Cl.[2] B03C *5/00*
U.S. Cl. 204—188 17 Claims



1. A filter for removal of finely divided solid particles from liquids of low electrical conductivity comprising a vertical cylindrical casing, a particulate filter bed of substantially spherical, smooth-surfaced, nondeformable particles of high electrical resistivity within the casing, a central electrode extending vertically through at least a portion of the filter bed, a vertical cylindrical perforated outer electrode extending longitudinally in the filter bed concentric with the central electrode, means for applying a voltage gradient in the range of 5 to 20 kv per inch between the central electrode and outer electrode, and inlet and outlet means constructed and arranged to direct liquid to be filtered radially through the particulate bed.

4,059,499

NITRATE ION SELECTIVE ELECTRODE

Hans Jørgen Ibsen Nielsen, Charlottenlund, and Elo Harald Hansen, Lyngby, both of Denmark, assignors to Bifok AB, Sollentuna, Sweden

Filed Nov. 19, 1976, Ser. No. 743,389
Claims priority, application Denmark, Nov. 20, 1975, 5217/75
Int. Cl.[2] G01N *27/30, 27/46*
U.S. Cl. 204—195 M 7 Claims

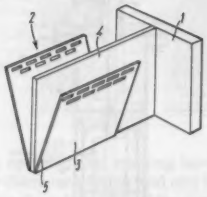
1. An electrode for measuring the concentration of nitrate ions in aqueous solutions comprising a container embodying an internal reference system and a non-porous polymer membrane mounted upon said container, said membrane comprising a combination of an electroactive material, a solvent and a non-porous polymeric membrane matrix material; wherein said electroactive material is organic nitrate ion sensitive and comprises a quaternary ammonium salt selected from the group consisting of: tetraoctyl ammonium nitrate, tetranonyl ammonium nitrate, tetradecyl ammonium nitrate, tetraundecyl ammonium nitrate, tetradodecyl ammonium nitrate, tetratridecyl ammonium nitrate and tetratetradecyl ammonium nitrate; wherein the solvent is a liquid of substantial viscosity and is a solvent for said quaternary ammonium salt, said solvent consisting of a dialkylphthalate or a dialkyladipate of a solubility parameter of 9 ± 2 $(cal/cm^3)^{\frac{1}{2}}$ and being substantially organophilic and hydrophobic; and wherein the polymer membrane matrix material is a non-porous polymer membrane matrix

material selected from the group consisting of polyvinylchloride and polyurethane.

4,059,500
ELECTRODE UNIT

Georgy Mikirtychevich Kamarian, Kotelnicheskaya naberezhnaya, 25/8, kv. 45, Moscow, U.S.S.R.

Filed Apr. 12, 1976, Ser. No. 676,206
Claims priority, application U.S.S.R., Apr. 14, 1975, 2122952
Int. Cl.[2] C25B *1/26, 9/02*
U.S. Cl. 204—288 **20 Claims**



1. An electrode unit of an electrolyzer for the electrolysis of solutions of halogenides of alkali metals, which comprises:

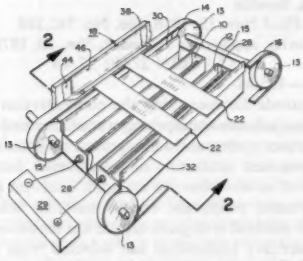
a first vertically arranged current-distribution support comprising a planar segment;

at least one open-work or perforated electrode member having working surfaces, at which there is released gas in the course of the electrolysis of solutions of halogenides of alkali metals, said electrode member being disposed proximate to said planar segment and electrically connected thereto and being so arranged in relation to said support that said working surfaces are at a predetermined angle to a vertical plane normal to said planar segment of said first current-distribution support said predetermined angle being taken in a vertical plane substantially parallel to said planar segment.

4,059,501
AUTOMATED ELECTROPHORESIS UNIT

Allen Strickler, Fullerton, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Filed Aug. 16, 1976, Ser. No. 707,399
Int. Cl.[2] G01N *27/26, 27/28*
U.S. Cl. 204—299 R **5 Claims**



1. Automated electrophoresis apparatus comprising:

a. an elongated electrophoretic separation chamber having an inlet and an outlet and including a pair of electrolyte wells;

b. electrolyte contained within said wells;

c. means for moving a strip of electrophoretic medium through said separation chamber from said inlet to said outlet;

d. electrode means disposed in electrical contact with said electrolyte in said wells and adapted to be connected to a source of d.c. power;

e. a pair of wicks disposed one to each of said wells to provide constant electrical contact between said electrolyte in said wells and the electrophoretic medium as it moves through said chamber whereby an unchanging electrical field will be established in a portion of the electrophoretic medium while it is moving through said chamber;

f. a flexible backing material releasably carrying strips of electrophoretic medium;

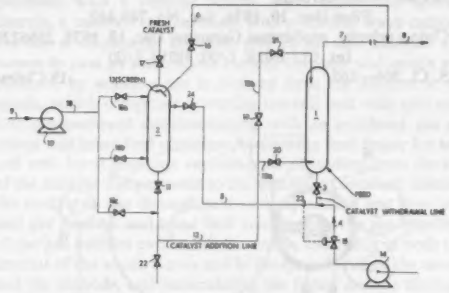
g. an input plate in parallel relationship with said moving means and having an edge adjacent the input of said chamber whereby said flexible backing material can be moved across said plate carrying said strips of electrophoretic medium toward said inlet and said moving means then bend around said edge to a new direction substantially normal to said moving means to cause said strips of electrophoretic medium to be released from said flexible backing material and continue into said inlet of said electrophoretic separation chamber to engage said moving means; and,

h. means for moving said flexible backing material across said input plate in the manner described.

4,059,502
CATALYST WITHDRAWAL

Lewis C. James, East Windsor, N.J., assignor to Cities Service Research and Development Company, Tulsa, Okla.

Filed Dec. 17, 1975, Ser. No. 641,852
Int. Cl.[2] C10G *13/00*
U.S. Cl. 208—152 **2 Claims**



1. In a heterogeneous catalytic process wherein a solid catalyst is withdrawn from a reactor during normal operations, a method controlling the catalyst withdrawal from the reactor comprising

pumping a transport fluid in a first conduit line equipped with a temperature controller and temperatures sensor, at a temperature T_1,

exiting a portion of the reactor contents, comprising catalyst and liquid reactants at a temperature T_2, through a second conduit line that joins said first line, thus mixing the transport fluid and reactor effluent,

measuring the temperature of the mixture, and

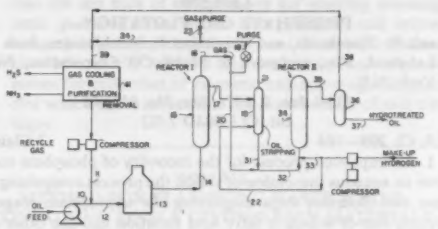
controlling the flow of transport liquid and reactor effluent, and thus the flow of said catalyst, by controlling the temperature of the resultant stream, until sufficient catalyst is withdrawn from the reactor.

4,059,503

STRIPPING AMMONIA FROM LIQUID EFFLUENT OF A HYDRODENITRIFICATION PROCESS

Morgan C. Sze, Upper Montclair; Harvey D. Schindler, Fairlawn, and Anthony Fanelli, Rockaway, all of N.J., assignors to The Lummus Company, Bloomfield, N.J.

Filed Aug. 5, 1976, Ser. No. 712,088
Int. Cl.[2] C10G 23/02
U.S. Cl. 208—254 H 8 Claims



1. In a process for the hydrodenitrification of a nitrogen containing feed by sequentially passing the feed through a series of hydrodenitrification zones containing at least two hydrodenitrification zones, wherein the nitrogen containing feed is contacted with hydrogen under hydrodenitrification temperature and pressure conditions to convert nitrogen present in the feed to ammonia, and wherein ammonia is purged from a hydrodenitrification zone effluent prior to the last hydrodenitrification zone in said series of hydrodentrification zones to maintain a low ammonia partial pressure in the last hydrodenitrification zone, the improvement comprising:

a. separately separating a gaseous effluent and a liquid effluent from said hydrodenitrification zone prior to said last hydrodenitrification zone;

b. stripping ammonia from said liquid effluent of step (a); and

c. introducing at least a portion of said gaseous effluent from step (a) and stripped liquid effluent from step (b) into the next hydrodenitrification zone, said separating of step (a), stripping of step (b) and introducing of step (c) being effected without cooling of the liquid and gaseous effluents to a temperature below hydrodenitrification temperatures.

4,059,504

HYDROTREATING OF PYROLYSIS GASOLINE

William V. Bauer, New York, N.Y., assignor to The Lummus Company, Bloomfield, N.J.

Filed July 21, 1976, Ser. No. 707,252
Int. Cl.[2] C10G 23/02
U.S. Cl. 208—255 8 Claims

1. In a process for selectively hydrogenating dienes in a liquid feed containing dienes, the improvement comprising:

effecting said hydrogenating in the presence of a cobalt-tungsten sulfide catalyst supported on high surface area alumina to produce a hydrotreated product without formation of dimers and higher polymers.

4,059,505

SEPARATING HYDROCARBONS

Colin William Cartwright, Woking, and Donald Lamb, Farnborough, both of England, assignors to The British Petroleum Company Limited, Sunbury-on-Thames, England

Filed Mar. 22, 1976, Ser. No. 668,843
Claims priority, application United Kingdom, Apr. 8, 1975, 14313/75
Int. Cl.[2] C07C 7/13; C10G 25/04
U.S. Cl. 208—310 Z 8 Claims

1. A cyclic vapour phase process for separating n-paraffins boiling in the gasoline, kerosine or gas oil ranges from a feed mixture thereof with non-straight chain hydrocarbons by means of a bed of a 5A molecular sieve comprising:

i. an adsorption stage in which the feed mixture is passed into the bed under conditions of increasing pressure and an effluent produced from which the n-paraffins have been at least partly removed, and

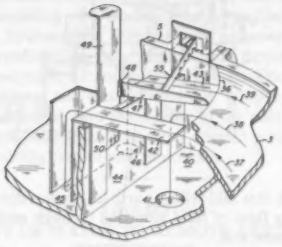
ii. a desorption stage in which the n-paraffins are desorbed from the bed by pressure reduction wherein the feed is stopped to the adsorption stage when at least 50% of the breakthrough volume has been passed and then a mixture richer in n-paraffins than the feed is passed through the bed, while the pressure is still rising.

4,059,506

ORE TAILINGS TREATMENT

Roy E. Bryson, Port Cartier, Canada, assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed May 23, 1975, Ser. No. 580,386
Int. Cl.[2] B03B 5/52
U.S. Cl. 209—18 7 Claims



1. A splitter box for recovering value-rich tailings from the discharge end of a spiral concentrator including vertical concentrate collection means comprising (a) central gravity conduit means located centrally or near the inside curve of the discharge end of the spiral for disposing of relatively value-poor tailings, and inner and outer conduit means on both the inside and outside portions of the curve of the discharge end of the spiral for recovering relatively value-rich tailings, and (b) means for bringing together relatively value-rich tailings from both the inner and outer conduit means for further processing.

4,059,507

CLASSIFYING APPARATUS FOR PARTICULATE MATERIALS

Yoshimori Nobuo, No. 143, Ozenji, Tama, Kawasaki, Japan

Filed June 10, 1976, Ser. No. 694,611
Claims priority, application Japan, June 13, 1975, 50-70913
Int. Cl.[2] B07B 9/02
U.S. Cl. 209—139 A 3 Claims

1. Apparatus, for classifying particulate material, comprising in combination:

i. a housing having a cylindrical wall and having at its top end a discharge opening for fine particulate material and at its bottom end a discharge opening for coarser particulate material

ii. means adjacent the bottom end of said housing for admitting a flow of fluid tangentially into said housing, thereby to create an upward whirling flow of fluid in said housing towards said top end discharge opening

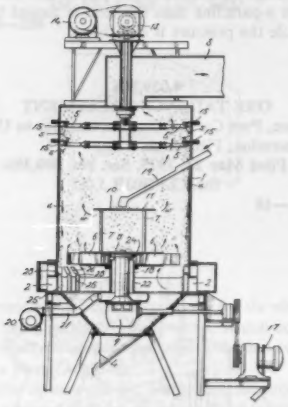
iii. means disposed intermediate said top end and said bottom end of said housing for admitting mixed fine and coarser particulate material into said upward whirling flow of fluid

iv. rotary vanes disposed in said housing adjacent the top end thereof for separating coarser particles from fine particles, such that said fine particles may be discharged through said top end discharge opening

v. a rotary disc disposed in said housing above said flow admitting means and below said rotary vanes, said disc including a plurality of radial nozzles,

vi. blower means connected to said nozzles for blowing fluid through said nozzles to project said fluid from said blower means as jet streams against the wall of said housing

vii. a plurality of guide plates disposed in said housing adjacent to said flow admitting means for smoothly guiding coarser particles falling down along the wall of said housing such that said falling particles are not disturbed by the whirling flow of fluid admitted through said flow admitting means, and



viii. a rotary dispersion plate disposed in said housing between said rotary disc and said material admitting means to receive thereon material admitted by said material admitting means, said plate being of less diameter than said rotary disc and being perforated to permit a portion of said admitted material to fall into a space between said plate and said rotary disc.

4,059,508

CONVEYOR FOR GRANULAR MATERIAL

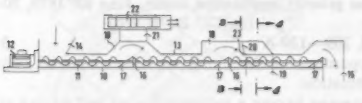
Jorma Metsa-Ketela, 60800 Ilmajoki, Finland

Filed Nov. 3, 1976, Ser. No. 738,466

Claims priority, application Finland, Nov. 7, 1975, 753137; Jan. 28, 1976, 760209; Oct. 7, 1976, 762853

Int. Cl.² B07B *4/02*; B65G *43/00*

U.S. Cl. 209—151 **9 Claims**



1. In a conveyer for granular material, elongated hollow channel means for receiving granular material which is to be conveyed along the interior of said channel means, cover means covering said channel means, rotary screw means extending longitudinally along the interior of said channel means for conveying granular materials therein longitudinally along the interior of said channel means, said rotary screw means including an elongated shaft extending longitudinally along the interior of said channel means and a screw carried by said shaft, at least one bearing means situated in said channel means at a portion of said shaft situated between opposed ends of said shaft for supporting said shaft for rotation, transverse wall means carried by said channel means in the interior thereof and supporting said bearing means, so that said wall means and bearing means together block the flow of granular material longitudinally along the interior of said channel means, and bypass means operatively connected with said channel means at the region of said transverse wall means and bearing means carried thereby for directing the material conveyed by said rotary screw means along a path at the region of said wall means and bearing means which bypasses said wall means and bearing means.

4,059,509

PHOSPHATE ORE FLOTATION

Frank B. Eisenhardt, and Stanislaus F. Muehlberger, both of Lakeland, Fla., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Jan. 9, 1976, Ser. No. 647,959

Int. Cl.² B03D *1/02*

U.S. Cl. 209—166 **3 Claims**

1. An improved process for the recovery of phosphate rock from an aqueous suspension of solids, the process comprising at least two flotation steps employing the appropriate reagent system, one of which is fatty acid flotation and the other an amine flotation, the improvement whereby the rougher concentrate from the fatty acid flotation is deoiled with a strong mineral acid, treated with lime to neutralize the strong acid, reagentized with an amine and refloated to recover the phosphate values present without washing following deoiling and addition of said lime.

4,059,510

MAGNETIC SEPARATORS

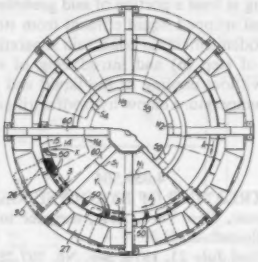
Hugh Thomas Reading, Goonellabah, Australia, assignor to Readings of Lismore Pty. Limited, Australia

Filed Jan. 13, 1976, Ser. No. 649,101

Claims priority, application Australia, Feb. 5, 1975, 0476/75

Int. Cl.² B03C *1/14*

U.S. Cl. 209—223 A **8 Claims**



1. A magnetic separator comprising:

a. a magnetically impermeable rotor mounted on a vertically oriented shaft and having at least one annulus constituting or formed on its periphery and defined by spaced-apart walls, the walls being formed from a material having non-magnetic characteristics, and the at least one annulus being disposed about the axis of rotation of the rotor,

b. a number of spacer bars of a magnetically permeable material extending in a radial direction between the walls of the annulus successive spacer bars together with the annulus walls defining through passages into which magnetic particles in a liquid slurry may be fed to pass in a direction substantially parallel to the axis of the rotor said spacer bars being of laminated construction with the planes of the laminations extending in the direction of rotation of the spacer bars,

c. a number of magnetic pole pieces surrounding the rotor and having their magnetic axes disposed radially with respect to the rotor said pole pieces providing successive radial magnetic pole regions of opposite polarity around

the rotor whereby a magnetic field of maximum intensity is induced in the spacer bars intermediate successive ones of the magnetic pole regions,

d. means for feeding the slurry into the top ends of said passages adjacent the magnetic pole regions,

e. a plurality of first means above the respective pole regions for delivering a washing fluid into the top ends of said passages for washing magnetic particles from within the passages,

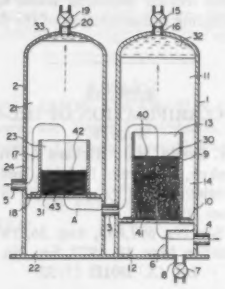
f. a plurality of second means for delivering a washing fluid into the top ends of said passages for washing non-magnetic particles from within the passages, said second means being disposed above top end of said annulus and circumferentially between said first means, and, separate means for collection of magnetic and non-magnetic particles which are washed from the bottom ends of said passages.

4,059,511

METHOD FOR CLARIFYING WASTE WATER CONTAINING FINELY DIVIDED OILY MATERIALS

Morito Musha, Seto; Tomizo Sawa, Nagoya, and Osami Kato, Kasugai, all of Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Filed June 28, 1976, Ser. No. 700,075
Int. Cl.² B01D *17/02*
U.S. Cl. 210—23 R **5 Claims**



1. A method for clarifying waste water containing finely divided oil materials together with finely divided sludge, which comprises:

a. passing said waste water through an upstream fibrous strata of hydrophilic organic polymer fibers and coarsening said finely divided oil materials to catch and collect the finely divided sludge;

b. passing said waste water into a space where said coarsened particles are allowed to form a separate layer on the upper surface of said waste water in said space and are removed from said waste water;

c. passing said waste water in said space through a downstream fibrous strata composed of hydrophilic organic polymer fibers, and coarsening the finely divided oily materials in said waste water to catch and collect the finely divided solid materials;

d. introducing said waste water into a space in which said coarsened articles are allowed to float and form a separate layer on the surface of said waste water in said space and are removed from said waste water; and

e. recovering clarified waste water, wherein said upstream, fibrous strata is composed of hydrophilic fibers having a denier of 10–300 and is distributed to form gaps of 40 to 180 microns between said fibers, said stratum having a density of from 0.1 to 0.45 g/cm², a thickness of 3 to 100 cm, and a water permeability of 5 cm/sec or less under a pressure of 40 cm of water, and wherein said downstream fibrous strata has gaps of 15 to 100 microns, on the average, formed between the fibers and wherein said gaps are smaller, on the average than those in said upstream strata.

4,059,512

PROCESS FOR REMOVING ENDOTOXIN FROM BIOLOGICAL FLUIDS

Nick S. Harris, Galveston, Tex., assignor to Preventative Systems, Inc.

Continuation-in-part of Ser. No. 536,833, Dec. 27, 1974, Pat. No. 3,959,128. This application Dec. 16, 1975, Ser. No. 641,230
The portion of the term of this patent subsequent to May 25, 1993, has been disclaimed.
Int. Cl.² B01D *15/00*
U.S. Cl. 210—24 **3 Claims**

1. A process for selectively removing endotoxin derived from gram-negative bacilli from biological fluids, said process comprising:

passing a biological fluid contaminated with gram-negative bacilli derived endotoxin through a microporous film, having an effective pore size of from about 0.04 to about 0.5 micrometers, of a non-ionogenic hydrophobic non-polar aliphatic synthetic plastic polymer selected from the group consisting of a substantially crystalline, non-polar aliphatic hydrocarbon thermoplastic polymer, a substantially crystalline non-polar aliphatic thermoplastic fluorocarbon polymer, a cross-linked aliphatic silicone elastomeric polymer and mixtures thereof, whereby the endotoxin is adsorbed onto the surface of the polymer; and

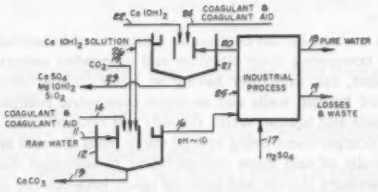
removing the biological fluid from contact with said polymer essentially free of said endotoxin.

4,059,513

TREATMENT OF WATER TO REMOVE CERTAIN IONS THEREFROM

Karel V. Zadera, Sunnyhill Road, Dover, N.J. 07801

Continuation-in-part of Ser. No. 601,645, Aug. 4, 1975, abandoned, which is a continuation of Ser. No. 498,318, Aug. 19, 1974, abandoned. This application Feb. 22, 1977, Ser. No. 770,826
Int. Cl.² C02B *1/20, 5/02;* C02C *5/02;* B01D *21/01*
U.S. Cl. 210—45 **4 Claims**



1. A two stage method of treating water to reduce concentrations of sulfate and hardness for use in a physical separation process where minerals contained in makeup water are concentrated by removing substantially pure water, producing sulfate ion concentrations in excess of 1500 ppm, consisting of the following steps:

a. Conducting a portion of said concentrated mineral rich process water to a first reaction chamber, adding calcium hydroxide to the first reaction chamber in an amount sufficient to substantially increase calcium ion concentration and to produce hydroxide ion concentration in excess of 1000 ppm as calcium carbonate and in the presence of solid calcium sulfate precipitate calcium sulfate, and removing portion of solid calcium sulfate from the first reaction chamber;

b. Transferring only the supernatant water from the first reaction chamber, to the second reaction chamber, adding raw makeup water to the second reaction chamber, the amount of raw water being several times greater than the

amount of supernatant water from the first reaction chamber, together with sufficient amount of carbon dioxide or bicarbonate, to react with essentially all the hydroxide brought from the first reaction chamber forming carbonate and precipitate essentially all of the formed calcium carbonate;

c. Transferring only the supernatant water from the second reaction chamber to said physical separation process;

d. adding sufficient sulfuric acid to said physical separation process to prevent scaling therein;

e. treating said supernatant water in said physical separation process to yield substantially pure water and a makeup water containing carbonate and sulfate hardness.

4,059,514

METHOD FOR PURIFICATION OF INDUSTRIAL WASTE WATER

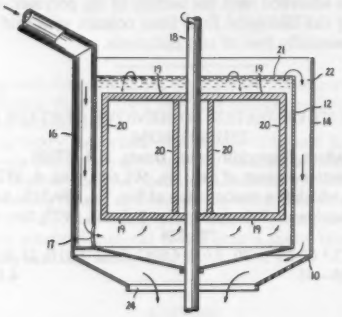
Knut Waldemar Jahnsen, Oslo, Norway, assignor to Elkem-Spigerverket A/S, Oslo, Norway

Continuation of Ser. No. 543,784, Jan. 24, 1975, abandoned, which is a division of Ser. No. 326,567, Jan. 24, 1973, Pat. No. 3,950,250. This application June 24, 1976, Ser. No. 701,352

The portion of the term of this patent subsequent to Apr. 13, 1993, has been disclaimed.

Int. Cl.² C02B *1/36*

U.S. Cl. 210—49 **1 Claim**



1. A method for the continuous treatment of industrial waste water containing toxic cyanides and suspended material in a container, said container having an inner compartment with side and bottom walls and an outer concentric compartment with side and bottom walls, the side and bottom walls of said outer compartment being spaced away from the side and bottom walls of said inner compartment to surround the inner compartment therein and provide space between the exterior of the side and bottom walls of said inner compartment and the interior of the side and bottom walls of said outer compartment, the entire bottom wall of said inner compartment being inside the outer compartment and spaced above the bottom wall of the outer compartment, said inner compartment having an inlet opening located in the bottom end portion thereof and said inner compartment being open at the top thereof, the rim at the top end portion of the side wall of said outer compartment being located above the top of the side wall of said inner compartment and in open communication with the open top of said inner compartment, said outer compartment having an outlet opening in the bottom wall thereof in open communication with the said space between the bottom walls of said inner and outer compartments, the said space between the bottom walls of the inner and outer compartments and the said opening in the bottom wall of said outer compartment being free of obstruction to provide in combination an unobstructed exit outlet passage for the flow of treated waste water, said method comprising:

a. continuously combining industrial waste water containing toxic cyanide and suspended material with:

i. a chemical reagent capable of rendering the toxic cyanides harmless for deposit in public waters, said chemical reagent being selected from the group consisting of sodium hypochlorite, gaseous chlorine and sodium hypochlorite/-sodium hydroxide;

ii. a flocculating reagent capable of flocculating said suspended materials;

b. continuously feeding said industrial waste water combined with said flocculating reagent and said chemical reagent through said inlet into said lower portion of said inner compartment;

c. continuously agitating said industrial waste water in said inner compartment;

d. continuously controlling the pH of said industrial waste water in said inner compartment to maintain a pH of from about 10 to about 11;

e. continuing the feed of industrial waste water to said inlet whereby the simultaneously treated industrial waste water including the treated cyanides and the flocculated sediment continuously rises in the inner compartment and continuously flows over the top of the sidewall of the inner compartment along a substantial length thereof and into said chamber;

f. removing the treated industrial waste water including the treated cyanides and the flocculated sediment from said chamber through said outlet in said outer compartment; and, thereafter

g. subjecting said treated industrial waste water to further treatment including sedimentation of the flocculated sediment.

4,059,515

PROCESS FOR CLARIFICATION OF OIL-CONTAINING WASTE

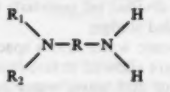
William J. Fowler, Berlin, N.J.; Richard A. Heberle, Holland; Richard G. Tonkyn, Cornwells Heights, and Norman Vorchheimer, Buckingham, all of Pa., assignors to Betz Laboratories, Inc., Trevose, Pa.

Continuation of Ser. No. 607,863, Aug. 26, 1975, abandoned. This application Mar. 18, 1977, Ser. No. 779,193

Int. Cl.² B01D *17/02*

U.S. Cl. 210—51 **18 Claims**

1. A process for separating oil from oil-containing wastewater which comprises treating the wastewater with a water-soluble cationic polymer consisting essentially of the product of the polymerization of an epihalohydrin with an alkylene polyamine having the formula



wherein R is a lower alkylene having from 2 to about 6 carbon atoms, and R_1 and R_2 are each a lower alkyl of from 1 to about 6 carbon atoms.

4,059,516

PROCESS FOR TREATING WOOL SCOURING WASTES

Willis A. Heisey, Denver, Pa., assignor to Geo. W. Bollman & Co., Inc., Adamstown, Pa.

Filed May 19, 1976, Ser. No. 687,538

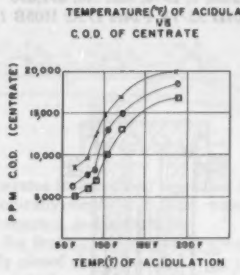
The portion of the term of this patent subsequent to Sept. 30, 1992, has been disclaimed.

Int. Cl.² C02B *1/20*

U.S. Cl. 210—53 **2 Claims**

1. An improved process for treating wool scouring waste liquors having an initial COD in excess of 20,000 ppm, including the steps of cooling the waste liquor to a temperature in the range of 80° to 90° F after discharge from a scouring bowl at

a temperature in the range of 130° to 150° F, adding acid and collodial bentonite to said cooled waste liquor, maintaining a pH range of 3.5 to 3.9 and bentonite at a weight to volume ratio in the range 0.10 to 0.3%, adding lime to adjust the pH range to 5.8 to 6.3 and flocculating the waste liquor, the improvement comprising the steps of heating the flocculated waste liquor to a temperature in the range of 130° to 150° F, separating the waste liquor into a supernatent liquor and a settled non-drainable grease containing sludge, and dewatering the settled grease containing sludge by centrifugal separation.



EFFECT OF TEMP OF ACIDULATION OF WOOL SCOUR LIQUOR ON FLOCCULATION EFFICIENCY (C.O.D.)

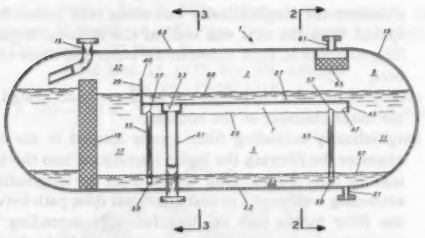
X 0.0 % BENTONITE
O 0.15% BENTONITE
□ 0.30% BENTONITE

4,059,517

LIQUID SEPARATION APPARATUS AND METHOD

David F. Strahorn, and Roger F. Goldstein, both of Oakland, Calif., assignors to Chevron Research Company, San Francisco, Calif.

Filed Sept. 13, 1976, Ser. No. 722,972
Int. Cl.² B01D *17/00*
U.S. Cl. 210—73 R **15 Claims**



1. Apparatus for gravity separation of a lighter liquid from a heavier liquid comprising in combination:

a vessel adapted to contain a mixture of said heavier and lighter liquids flowing longitudinally therein;

generally horizontal baffle means extending transversely entirely across the interior of said vessel and extending longitudinally to separate an upper space above said baffle means from a lower space below said baffle means in said vessel, said upper space and said lower space being in communication through passage means located adjacent a first longitudinal end of said baffle means;

said baffle means defining a sloping floor of said upper space, said floor having a higher portion and a lower portion;

means extending upwardly from a second longitudinal end of said horizontal baffle means to a height above said higher floor portion and extending transversely entirely across said horizontal baffle means for preventing the flow of liquid between said upper space and lower space;

said vessel including inlet means for introducing a mixture of said lighter liquid and said heavier liquid into said vessel and into said lower space

adjacent said second longitudinal end of said baffle means, said mixture flowing toward said first end of said baffle means whereupon said heavier liquid gravity separates from said lighter liquid and collects along the bottom of said lower space, and said lighter liquid flows along the top of said lower space and enters said upper space through said passage means;

said vessel including liquid outlet means communicating with said lower space for conducting said heavier liquid from said vessel;

first conduit means communicating with said upper space for conducting said lighter liquid from said vessel; and

second conduit means communicating with said upper space at a location lower than said first conduit means and adjacent said lower portion of said upper space floor for conducting from said upper space into said lower space heavier liquid which enters said upper space and gravity separates from said lighter liquid along said sloping floor.

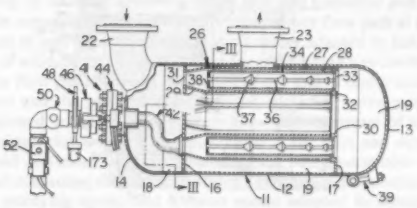
9. Apparatus as defined in claim 1 further including a generally vertically oriented coalescing pad disposed transversely within said vessel between said inlet means and said horizontal baffle means.

4,059,518

FILTER WITH AXIALLY SHIFTABLE ROTATING BACKWASH SELECTOR

John W. Rishel, Vicksburg, Mich., assignor to Dover Corporation, Portage, Mich.

Filed July 29, 1975, Ser. No. 599,956
Int. Cl.² B01D *29/26*
U.S. Cl. 210—108 **11 Claims**



1. A filter assembly for removing contaminants from a fluid, comprising:

closed, hollow housing means;

a plurality of individual filter units circumferentially arranged in said housing means;

means compartmenting said housing means for channeling a contaminated fluid to be filtered in a filtering direction through said filter units from one end of each thereof and for receiving filtered fluid from the other ends of said filter units;

a rotatable backwash arm means in at least one end of said housing means and engageable with said one end of a given said filter unit for backwash fluid flow communication therewith, said rotatable backwash arm means including an arm conduit within said housing means and having a central extension passing from said housing means in sealed and rotatably and axially movable relation therewith, said one ends of said filter units lying substantially in a plane, the rotational axis of said backwash arm means being substantially perpendicular to said plane and coaxial with the circumferential array of filter units, said array of filter units and said backwash arm means being confined to zones on opposite sides of said plane;

means engaging said backwash arm means and actuable for rotatably indexing said backwash arm means from filter unit to filter unit while simultaneously axially offsetting

said backwash arm means away from said plane of said filter unit one ends during rotative movement of the backwash arm means, thereby to prevent scrubbing contact therebetween;

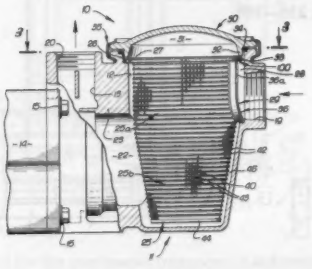
diametrically spaced pivot means on said one housing end, said means for axially offsetting said backwash arm means comprising collar means surrounding said arm conduit extension, bearing means coaxially locating said collar means with respect to said arm conduit extension and permitting rotation of said arm conduit extension therewith, annular means axially fixing said bearing means with respect to said arm conduit extension, yoke means adjacent said collar means and diametrically gimballed with respect thereto, said yoke means including mechanical advantage means pivotally coupled to said diametrically spaced pivot means and including a resilient motor means interposed therein and actuable for substantially axially reciprocating said collar means and hence said backwash arm means.

4,059,519

PUMP BASKET STRAINER AND ASSEMBLY

Steven A. Zieg, Yorba Linda, Calif., assignor to Purex Corporation, Lakewood, Calif.

Filed Dec. 29, 1975, Ser. No. 645,086
Int. Cl.² E04H *3/20*
U.S. Cl. 210—169 **7 Claims**



1. In a pump volute housing and strainer assembly,

a. a housing forming a downwardly extending primary chamber having an upper level fluid inlet port and a lower level fluid outlet port, said ports located at opposite sides of the chamber, the housing having an internal support ledge, and

b. a fluid strainer basket received downwardly in said chamber and supported on said ledge, the basket having a side inlet in registration with said primary chamber inlet port, the basket having exteriorly and interiorly presented ribs that intersect to form perforations to pass fluid from the basket interior to said primary chamber outlet port,

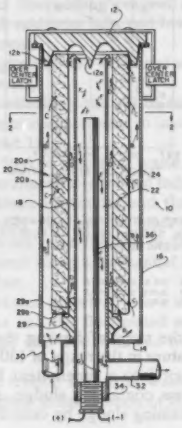
c. said internal support ledge being located above the level of said primary chamber inlet port, the ledge extending about the basket but being interrupted by an upward extension of said primary chamber inlet port, the basket having an external flange engaging said ledge, the flange extending generally circularly over the basket side inlet to thereby define a handle adapted to be grasped from the basket upper interior to remove the basket upwardly from the primary chamber, the basket and housing having generally vertically extending guide means proximate said inlet port and cooperating to locate the handle generally above said inlet port when the basket is received downwardly into said chamber.

4,059,520

APPARATUS FOR FILTERING AND HEATING A LIQUID

Thomas W. Roller, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed June 1, 1976, Ser. No. 691,690
Int. Cl.² B01D *35/18*; F24H *1/10*; H05B *1/00*
U.S. Cl. 210—184 **5 Claims**



1. An apparatus for filtering and heating a liquid, which apparatus comprises:

means defining an elongate housing having first and second opposed end walls;

means within said housing including a longitudinally extending imperforate wall means to define an inner chamber and cooperating with the elongate housing to define an outer chamber which substantially surrounds the inner chamber, the longitudinally extending wall means being spaced from the first end wall of the housing to permit filtered liquid to flow between the outer and inner chambers;

means for introducing a liquid to be filtered and heated into the outer chamber of the housing;

longitudinally extending filter means located in the outer chamber for filtering the liquid introduced into the housing, the filter means being spaced from the longitudinally extending wall means to define a liquid flow path between the filter means and the longitudinally extending wall means for flow of the filtered liquid towards the first end wall of the housing;

the first end wall of the housing including a dependent portion of generally conical configuration which extends into the inner chamber and has a base external of the inner chamber and a vertex within the inner chamber, said portion cooperating with the longitudinally extending imperforate wall means to reverse the direction of the liquid moving towards the first end wall of the housing and to direct the liquid to flow into the inner chamber in a direction towards the second end wall of the housing;

longitudinally extending heating means located in the inner chamber of the housing and extending from the second end wall of the housing towards the first end wall of the housing for heating the filtered liquid as it flows along the heater means; and

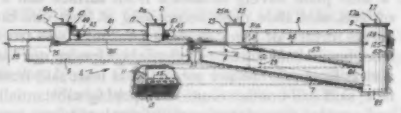
means located proximate the second end wall of the housing for removing filtered and heated liquid from the inner chamber.

4,059,521

SEWAGE PURIFICATION SYSTEM

Roy W. Lumsden, 13355 Granada, Houston, Tex. 77015

Filed Dec. 19, 1975, Ser. No. 642,377
Int. Cl.[2] C02B *1/34;* C02C *1/12*
U.S. Cl. 210—195 S 10 Claims



1. An apparatus for purifying untreated liquid sewage containing biologically degradable solid waste material, which apparatus comprises, in combination:

A. means for feeding said untreated sewage into a first substantially closed elongate tank having a substantially horizontal axis and means for agitating and separate means for aerating the sewage in said tank to effect almost complete digestion thereof,

B. a second substantially closed elongate tank having a generally horizontal longitudinal axis declined with respect to the longitudinal axis of the first tank for receiving the treated sewage from the first tank and for settling the treated sewage,

C. a substantially closed collection tank disposed at the lower end of the second tank for receiving the settled sewage from the lower end of the second tank and for separating the settled sewage into a purified liquid component and a residual solid waste material in suspension component,

D. a recycle means for recycling the residual solid waste material in suspension component back to the first tank, and

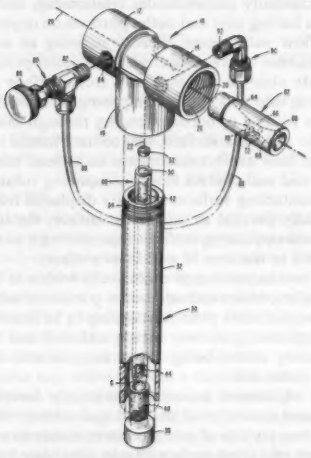
E. a substantially closed third elongate tank for receiving and distributing the purified liquid component into the ground.

4,059,522

APPARATUS FOR PURIFYING WATER

Richard D. Polley; Eric L. Nilson; Roberto Constantakis, and Donovan E. Pruitt, all of El Paso, Tex., assignors to Iodinamics Corporation, El Paso, Tex.

Filed Dec. 12, 1975, Ser. No. 640,200
Int. Cl.[2] C02B *1/18*
U.S. Cl. 210—198 R 7 Claims



1. An apparatus for purifying water comprising a fitting for installation in a water line, said fitting having substantially parallel sections defining a primary water flow path having openings for receiving inlet and outlet water lines, said fitting also having a laterally extending section defining a secondary water flow path, a Venturi tube mounted in said fitting in said primary water flow path, said Venturi tube defining a Venturi having a converging section, a throat and a diverging section, said converging section and said diverging section adapted to face upstream and downstream, respectively, relative to said primary water flow path, said Venturi tube defining an opening communicating with said throat and said secondary water flow path, a tank removably connected to and extending below said laterally extending section of said fitting to define a sump, a container housed within said tank and secured at one end to said opening in said Venturi tube and having its other end extending above the bottom of said tank, said container adapted to hold a bed of iodine crystals, distributor means positioned at the inlet and outlet of said container, said distributor means being permeable to water containing dissolved iodine and impermeable to said iodine crystals, and a metering valve having an inlet communicating with said primary water flow line at one end of said Venturi tube and having an outlet in flow communication with the inlet of said tank, said Venturi creating a pressure differential forcing a small portion of the water to flow through said metering valve, said tank and said container and be returned to said primary water flow stream at the throat of said Venturi, said container having a cross-sectional flow area which provides minimum velocity, as calculated through the freeboard area of said container, of about 7 cm/sec based on the volume flow through said container to produce a solution with a constant iodine concentration.

2. An apparatus for purifying water comprising a fitting for installation in a water line to define a primary water flow path, a Venturi means mounted in said fitting in said primary water flow path, a container housed in a tank defining a sump and having an inlet for admitting water into said container and an outlet communicating with said primary water flow path at the throat of said Venturi means, said container adapted to hold a bed of solid purfying agent, means for establishing a secondary water flow path between said fitting at one end of said Venturi means and the inlet of said container, metering valve means positioned in the secondary water flow path upstream of said container, distributor means positioned at the inlet and outlet of said container, said distributor means being permeable to water containing dissolved purifying agent and impermeable to said purifying agent, said Venturi means adapted to create a pressure differential forcing a small portion of the water in the water line to flow through said bed of purifying agent and be returned to said primary water flow path, said container having a cross-sectional flow area which provides a minimum velocity, as calculated through the freeboard area of said container, of about 7 cm/sec based on the volume flow through said container to produce a solution with a constant purifying agent concentration.

4,059,523

COLUMN FOR USE IN HIGH SPEED LIQUID CHROMATOGRAPHY

Koichi Mochizuki, and Shigeho Hiragaki, both of Hachioji, Japan, assignors to Japan Spectroscopic Co., Ltd., Tokyo, Japan

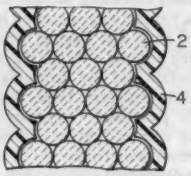
Filed Sept. 23, 1976, Ser. No. 725,938
Int. Cl.[2] B01D *15/08*
U.S. Cl. 210—198 C 5 Claims

1. A column for use in high speed liquid chromatography which is constructed by closely packing a solid phase in a hollow tubular body, said column comprising:

a solid phase wherein the composing solid particles, having a substantially uniform particle size of a sphere having a diameter less than 0.10 mm, are packed in said tubular body in close contact relationship with each other; and

a tubular body having an inner diameter less than 1.0 mm, which is made of fluoro-carbon resin, and which is de-

formed to be adapted to the particles located at the radially outermost position, for permiting all of the particles



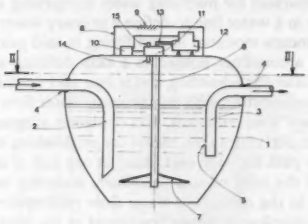
confronting with the inner surface thereof to closely contact therewith, substantially leaving no void spaces therebetween.

4,059,524

WATER PURIFYING DEVICE WITHOUT MOVABLE MECHANICAL PART IN CONTACT WITH THE LIQUID TO BE TREATED

Jean Chataigner, 11 rue Hemingway la chaine, Plaisir 78370, and Jean-Claude Joseph Rader, 2 rue Paul Gimont, 92500 Rueil Malmaison, both of France

Filed May 11, 1976, Ser. No. 685,418
Claims priority, application France, May 15, 1975, 75.15255
Int. Cl.[2] C02B *1/34;* C02C *5/04*
U.S. Cl. 210—220 **9 Claims**



1. A water purifying device comprising a single tank defining a single chamber, a water feeding pipe extending into said chamber and having an outlet disposed in said chamber at a selected level, a water exhaust pipe extending into said chamber and having an outlet located in said chamber at a level above said selected level, the level at which said water exhaust pipe extends out of said chamber being lower than the level at which said water feeding pipe extends into said chamber, said tank having an upper portion and means for supplying gas under pressure at said upper portion, a stationary gas dispersing means extending into said tank to the lower part of said chamber, gas flow means located at the upper part of said chamber, and control valve means connected to said gas supplying means, said control valve means being movable, at least, between a first position, wherein gas under pressure is supplied to said stationary gas dispersing means and said gas flow means is connected to the atmosphere, and a second position, wherein said gas supplying means is connected to said gas flow means and said stationary gas dispersing means is closed.

4,059,525

SLIDE FILTERS

Leonard L. Krasnow, 293 Turnpike Road, Westboro, Mass. 01581

Filed June 28, 1976, Ser. No. 700,100
Int. Cl.[2] B01D *25/12*
U.S. Cl. 210—236 **18 Claims**

1. A slide filtration apparatus for filtering a fluid material, comprising in combination:

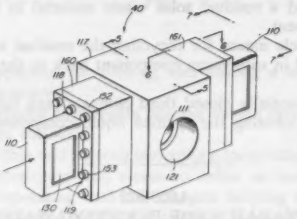
A. a fluid flow path means having a fluid inlet and a fluid outlet,

B. guideway means which intersects said flow path means in a substantially perpendicular relationship, said guideway means having inlet and outlet portions on opposite sides of said flow path means, thereby defining an area of flow intersection between said inlet and outlet portions,

C. a slide plate having at least a front surface and a back surface, said slide plate comprising at least one breaker means formed of bores extending through said front surface to said back surface; seal contact means surrounding said at least one breaker means on at least said front surface; said seal-contact means comprising substantially flat seal-contacting surfaces spatially displaced from and substantially parallel to said front surface; the total area of said seal-contacting surfaces representing a minor fraction relative to the area of said front surface,

D. seal means positioned within said guideway means; said slide plate functioning to be insertable in and through said guideway means and said seal means; said guideway means being larger in cross-section than said slide plate, and

E. seal adjustment means cooperatively functioning with said seal means to adjust said seal means within said guideway means so as to contact at least said front surface of said slide plate exclusively at said seal-contacting surfaces so as to enable said slide plate to be moved with reduced friction through said guideway for substantially continuous filter changing while maintaining substantially unchanged the adjustment of said seal adjustment means.



10. A slide filtration apparatus for filtering a fluid material, comprising in combination:

A. a fluid flow path means having a fluid inlet and a fluid outlet,

B. guideway means which intersects said flow path means in a substantially perpendicular relationship, said guideway means having inlet and outlet portions on opposite sides of said flow path means, thereby defining an area of flow intersection between said inlet and outlet portions,

C. a slide plate having at least a front surface and a back surface, said slide plate comprising at least one breaker means formed of bores extending through said front surface to said back surface; seal contact means surrounding said at least one breaker means on at least said front surface; said seal-contact means comprising substantially flat seal-contacting surfaces spatially displaced from and substantially parallel to said front surface; the total area of said seal-contacting surfaces representing a minor fraction relative to the area of said front surface,

D. seal means positioned exclusively within at least one of said inlet portion and said outlet portion of said guideway means; said slide plate functioning to be insertable in and through said guideway means and said seal means; said guideway means being larger in cross-section than said slide plate, and

E. seal adjustment means cooperatively functioning with said seal means to adjust said seal means within said at least one portion of said guideway means so as to contact at least said front surface of said slide plate exclusively at said seal-contacting surfaces exclusively within said at

least one portion of said guideway means so as to enable said slide plate to be moved with reduced friction through said guideway for substantially continuous filter changing while maintaining substantially unchanged the adjustment of said seal adjustment means.

4,059,526

DEVICE FOR COLLECTING LIGHT-WEIGHT SUBSTANCES FLOATING ON A LIQUID SURFACE

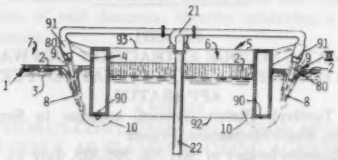
Cornelis Gerardus Middelbeek, Nootdorp, Netherlands, assignor to Ballast Nedam Groep N.V., Amstelveen, Netherlands

Filed Mar. 24, 1976, Ser. No. 669,834

Claims priority, application Netherlands, Apr. 4, 1975, 7504064

Int. Cl.² E02B *15/04*

U.S. Cl. 210—242 S **9 Claims**



1. In apparatus for collecting light-weight material such as oil, from the surface of a body of water, which comprises wall means defining an enclosure for isolating a volume of a body of water from the free surface of the water outside such isolated volume, said wall means extending from a level above said free surface to a level below the oil so as to define a reservoir space which communicates directly with the body of water beneath the reservoir space; and nozzle means outside of and spaced from said wall means for downwardly and inwardly directing a stream of water through the oil on the surface of the body of water to a location beneath the open bottom of said enclosure said nozzle means comprising at least one jet nozzle discharging water at said downward inclination to impinge said oil; the improvement which comprises:

guide means attached to said jet nozzle and extending downwardly therefrom at said inclination to terminate at a point below the level of said light-weight material, said guide means being oriented with respect to said jet nozzle such that the water discharged therefrom clings to and concentrically surrounds said guide means.

4,059,527

PRETREATMENT FILTER PRESS DEWATERING SYSTEM

Albert Bühr, Parallelstrasse 2A, D-6683 Elversberg, Saar, Germany

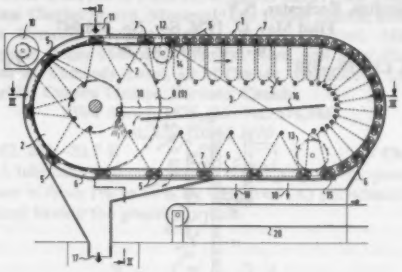
Filed Nov. 17, 1975, Ser. No. 632,691

Claims priority, application Germany, June 4, 1975, 2524851

Int. Cl.² B01D *33/02*

U.S. Cl. 210—259 **8 Claims**

1. An apparatus for the removal of an appreciable amount of liquid from an aqueous mixture having an appreciable solids content, which comprises a system of continuous filter pocket means, said filter pocket means being positioned to travel in an endless pattern whereby at one position said mixture enters into individual filter pocket means and at a second position said filter pocket means discharges the partially dewatered aqueous mixture out of said apparatus, each said filter pocket means having an open top, sidewalls and a closed bottom, said sidewalls and bottom comprising perforated material for the drainage of liquid therethrough, means for delivering an aqueous mixture of material into the open tops of said pocket means when those tops face upwardly, means for discharging an aqueous mixture of material from the open tops of said pocket means when those tops face downwardly, said apparatus further comprising means to compress the pocket means to reduce



the volume thereof after delivery of material thereinto and prior to discharge of material therefrom.

4,059,528

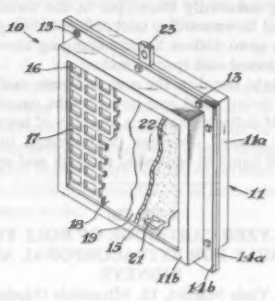
CARTRIDGE FILTER

Sandor Grosshandler, Middleburgh Heights, Ohio, assignor to The Dow Chemical Company, Midland, Mich.

Filed Feb. 9, 1976, Ser. No. 656,762

Int. Cl.² B01D *27/02*

U.S. Cl. 210—282 **9 Claims**



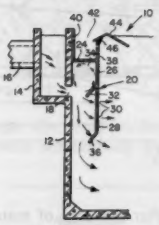
1. A filter cartridge, the filter cartridge comprising a hollow frame defining therein a fluid passage opening for liquid to pass through, the hollow frame having at least a first frame portion and a second frame portion, each of the frame portions being disposed in generally facing mating relationship and means to affix the first frame portion to the second frame portion, the hollow frame defining a generally inwardly facing annular channel, the channel being bounded by inwardly facing channel edges and surrounding the fluid passage opening, the channel edges having disposed thereon oppositely disposed sealing ridges or projections, the sealing ridge of the first frame portion and the second frame portion being generally oppositely disposed and dependent toward each other, first and second rigid foraminous sheet members disposed on first and second sealing ridges respectively, the first and second foraminous members being disposed in generally fixed parallel relationship across the fluid passage opening, first and second flexible foraminous members disposed adjacent, and between the first and second rigid foraminous members respectively, the first and second both rigid and flexible sheets extending into the annular channel a compressible particulate sorptive mass in partially compressed form disposed between the flexible foraminous members the amount of compression being sufficient to maintain the mass in position so that stratification does not occur under desired flow conditions and means to prevent substantial fluid flow from the annular channel between the first and second frame portions.

4,059,529

BAFFLE FOR WATER OR SEWAGE SETTLING TANKS

Robert F. McGivern, Columbus, Ohio, assignor to Sybron Corporation, Rochester, N.Y.

Filed May 17, 1976, Ser. No. 686,947
Int. Cl.[2] B01D *21/24*
U.S. Cl. 210—519 7 Claims



1. A baffle for water or sewage settling tanks adapted for attachment to an end wall of the tank containing inlets from which liquid to be treated enters the tank, said baffle comprising:

a. an upright panel;

b. a spacer fixed to and extending substantially normal to said upright panel for attaching said panel to the end wall of the tank containing said inlets;

c. at least one deflector on said upright panel, said deflector extending outwardly therefrom in the direction of said spacer and downwardly, said deflector being below said spacer so as to deflect liquid impinging thereagainst upwardly toward said spacer; and

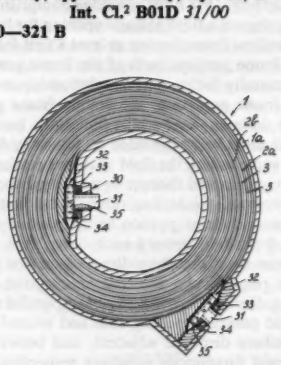
d. said upright panel in the area between said spacer and deflector being solid and said upright panel in the area below said deflector having a plurality of horizontally and vertically spaced openings therethrough to permit the passage of liquid to be treated through said upright panel.

4,059,530

DIALYZER CARTRIDGE OF ROLL TYPE PARTICULARLY FOR EXTRACORPORAL ARTIFICIAL KIDNEYS

Libero Luppi, Viale Martiri, 13, Mirandola (Modena), Italy

Filed Apr. 7, 1975, Ser. No. 565,506
Claims priority, application Italy, Apr. 10, 1974, 21235/74
Int. Cl.[2] B01D *31/00*
U.S. Cl. 210—321 B 7 Claims



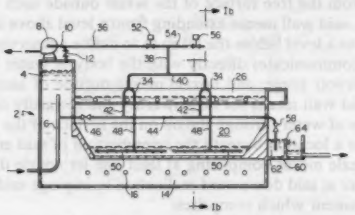
1. A dialyser cartridge of roll type particularly for extracorporal artificial kidneys comprising an outer casing, a support element consisting of a length of plastics material sheet spirally wound in said casing and having a longitudinally extending web and at least one type of projections on both sides of the web distributed in aligned arrangement to provide spaces between the projections defining fluid flow passages for the dialysing liquid, the aligned arrangement of said projections on one side of said web defining a first plurality of parallel directional lines and the aligned arrangement of the projections on the other side of said web defining a second plurality of parallel centerlines, a flattened tubular dialyser membrane longitudinally and transversely coextensive with said support element and disposed, along turns thereof between said one side of said support element and said other side of the subsequent turn of said support element and wherein, the improvement consists in that at least part of said first plurality of directional lines is arranged at an angle with respect to said second plurality of directional lines, said first and said second plurality of directional lines crossing each other at least partially and at least part of said projections on one side of said web abutting with the interposition of said membrane against the projections on the other side of the web thereby to prevent embedding of said projections on one side of said web in the spaces between said projections on the other side of said web.

4,059,531

AUTOMATIC SLUDGE EXTRACTION AND WASHING DEVICE FOR USE IN A WATER TREATMENT SETTLING APPARATUS

Jacques Tardivel, Plaisir, France, assignor to Societe Degremont, Rueil-Malmaison, France

Continuation-in-part of Ser. No. 595,303, July 11, 1975, abandoned. This application Feb. 15, 1977, Ser. No. 768,821
Claims priority, application France, Aug. 8, 1974, 74.27523
Int. Cl.[2] B01D *23/00*
U.S. Cl. 210—522 10 Claims



1. In a sludge bed settling apparatus of the type including a decanter containing therein a sludge bed, means for introducing fluid to be treated into said decanter and for passing said fluid upwardly through said sludge bed, whereby impurities are removed in the form of settling sludge, and a sludge concentrator for collecting a portion of said sludge; the improvement of means for selectively extracting sludge from said concentrator and for selectively washing said concentrator and decanter, said extracting and washing means comprising:

at least one siphon having a first end extending into said concentrator and a second end;

a manifold conduit extending from said fluid introducing means to a sludge removal station, said second end of said siphon being connected to said manifold conduit;

a vacuum source;

first valve means selectively movable from a first position connecting said siphon to said vacuum source to a second position blocking connection between said siphon and said vacuum source;

second valve means selectively movable from a first position connecting said siphon to atmosphere and a second position blocking said siphon from atmosphere;

third valve means selectively movable from a first position connecting said manifold conduit to said fluid introducing means and a second position blocking connection between said manifold conduit and said fluid introducing means;

fourth valve means selectively movable from a first position connecting said manifold conduit to said sludge removal

station to a second position blocking connection between said manifold conduit and said sludge removal station;

whereby, when said first, second, third and fourth valve means are respectively in said first, second, second and first positions thereof sludge in said concentrator is sucked by said vacuum source into said first end of said siphon, out said second end of said siphon into said manifold conduit, and from said manifold conduit to said sludge removal station, thereby achieving a sludge extraction operation; and

whereby, when said first, second, third and fourth valve means are respectively in said first, second, first and second positions thereof, fluid passes from said fluid introducing means into said manifold conduit, is sucked by said vacuum source into said second end of said siphon, passes through said first end of said siphon into said concentrator, thereby washing said concentrator, and overflows said concentrator, thereby falling onto and washing the bottom of said decanter, thereby achieving a washing operation.

4,059,532

PHOSPHORUS-CONTAINING REACTION PRODUCTS USEFUL AS FLAMEPROOFING AGENTS

Hermann Nachbur, Dornach, and Peter Rohringer, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Dec. 5, 1975, Ser. No. 638,140

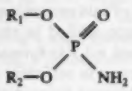
Claims priority, application Switzerland, Dec. 9, 1974, 16311/74; Feb. 12, 1975, 1716/75

Int. Cl.² C09K *3/00*

U.S. Cl. 252—8.1 15 Claims

1. A phosphorus-containing condesation products made from

a. 2 to 6 moles of an amidophosphate of the formula



in which R_1 and R_2 each independently are alkyl having 1 to 4 carbon atoms, halogenoalkyl or alkenyl having 2 to 4 carbon atoms, or R_1 and R_2 together are alkylene having 2 to 4 carbon atoms;

b. 1 mole of a 1,3,5-triazine substituted by at least 2 primary amino groups;

c. 2 to 12 moles of formaldehyde or of an agent releasing formaldehyde; and optionally

d. 0 to 6 moles of an alkanol having 1 to 4 carbon atoms.

4,059,533

OXYGEN SCAVENGING METHODS AND ADDITIVES

Jimmie L. Watson, and Leroy L. Carney, both of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Filed Oct. 29, 1974, Ser. No. 518,306

Int. Cl.² C09K *7/02, 7/04;* E21B *43/22;* C01B *17/66*

U.S. Cl. 252—8.5 A 5 Claims

1. A method of maintaining the oxygen concentration in an aqueous fluid at a very low concentration comprising; adding to said aqueous fluid an oxygen scavenging composition comprising a carrier liquid having dispersed therein sodium dithionite or a mixture thereof with sodium dithionate, said carrier liquid containing a thickening agent to suspend therein said sodium dithionite or a mixture of sodium dithionite with sodium dithionate, wherein said carrier liquid is selected from the group consisting of liquid aliphatic hydrocarbon, liquid aromatic hydrocarbon and mixtures thereof.

4,059,534

HYDROCARBON/SILICON OIL LUBRICATING COMPOSITIONS FOR LOW TEMPERATURE USE

William Charles Morro, Montreal; Leo Ernest Hakka, Dollard des Ormeaux; James Mackay Brophy, Dorval; Michel Jacques Roger Hebrard, Montreal Nord, and Jean Claude Courtes, Chomedy Laval, all of Canada, assignors to Union Carbide Canada Limited, Toronto, Canada

Filed Apr. 7, 1976, Ser. No. 674,346

Int. Cl.² C10M *1/50*

U.S. Cl. 252—32.7 E 29 Claims

1. A lubricating oil composition comprising a homogeneous mixture of from 1% to 50% by weight of (A) poly(dimethylsiloxane) having the general formula:

when R is a methyl group in essentially all cases and n has a value such that the average viscosity of the poly(dimethylsiloxane) at 100° F is between 10,000 cs and 1,000,000 cs, and the remainder of said mixture consisting of (B) hydrocarbon oil having a viscosity of less than 40,000 cs at −65° F, and a flashpoint higher than 175° F, and said hydrocarbon oil being at least one selected from the group consisting of (a) alkenes, (b) isoparaffins, and (c) naphthenics having a single ring which has multiple alkyl substituents; in the case of (a) and (b), the longest carbon chain, and in the case of (c) any alkyl substituent in which the longest carbon chain exceeds five carbon atoms, has multiple substituent alkyl branches, and its methyl branched homolog has a solubility parameter of less than 7.84 and said substituent alkyl branches of four or more carbon atoms are themselves branched, and where at least 50% of said substituent alkyl branches are bonded to carbons of the longest carbon chain which are immediately adjacent, or separated by only one carbon atom.

4,059,535

ASHLESS DETERGENT ADDITIVES FOR FUELS AND LUBRICANTS

Albert N. De Vault, and Hans D. Holtz, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed May 28, 1976, Ser. No. 691,119

Int. Cl.² C10M *1/40, 3/34, 5/22, 7/38*

U.S. Cl. 252—33 12 Claims

1. A method for producing detergent additive for lubricants and fuels comprising:

1. reacting a long chain monocarboxylic acid having the general formula R'COOH in which R' is a long chain aliphatic radical having 10–30 carbon atoms with a multiamine represented by the generic formula $N(RNH_2)_3$ wherein R is an aliphatic radical having 1–6 carbon atoms to produce an amide and

2. further reacting the product of (1) with sulfonic acid represented by the formula $R''SO_3H$ where R'' is aliphatic, cycloaliphatic, or alkaryl having 12–30 carbon atoms in the molecule to produce a sulfonated product.

4,059,536
IMPROVED PROCESS FOR PREPARING SUPERBASIC DETERGENT ADDITIVES

Jacques Lallement, Aubervilliers; Guy Parc, Rueil Malmaison, and Gabriel de Gaudemaris, Grenoble, all of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France

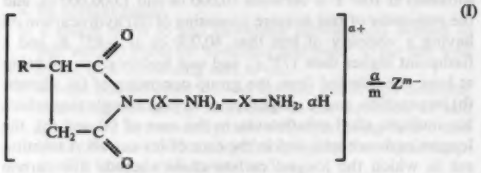
Filed Mar. 27, 1975, Ser. No. 562,897

Claims priority, application France, Mar. 29, 1974, 74.11255; May 14, 1974, 74.16958

Int. Cl.[2] C10M *1/40*

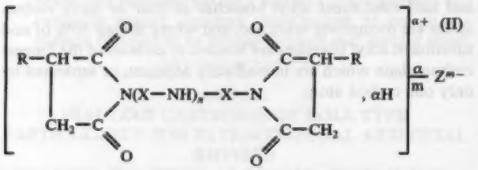
U.S. Cl. 252—33.3 **32 Claims**

1. In a process for preparing a superbasic detergent additive that comprises (a) contacting sulfonic acid with an excess of oxide or hydroxide of a metal element selected from the group consisting of lithium and a metal of Group IIA of the Periodic Classification for a time sufficient to form the sulfonic salt of said metal element, (b) contacting the reaction mixture from step (a) with an amount of carbon dioxide sufficient and at a temperature sufficient to carbonate a substantial portion of the excess amount of said oxide or hydroxide, and (c) separating the uncarbonated fraction of said oxide or hydroxide from the reaction mixture, wherein the improvement comprises employing in the reaction mixture of steps (a), (b) and (c) at least one salt of the formula



(I)

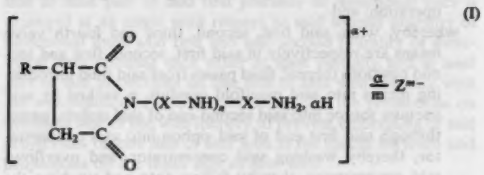
or



(II)

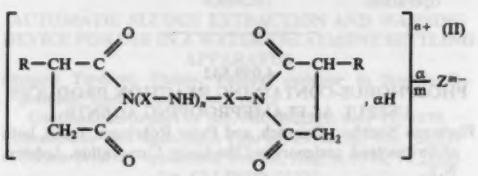
where R is a substantially saturated aliphatic hydrocarbon radical containing from 20 to 250 carbon atoms, X is an alkylene radical of 2–5 carbon atoms, the valences of which are located on separate carbon atoms, n is an integer from 1 to 5, Z^{m-} represents the anion of a protonic acid selected from the group consisting of a halohydric acid, a hydrocarbyl monocarboxylic acid of 1–24 carbon atoms, a hydrocarbyl dicarboxylic acid and a hydrocarbyl polycarboxylic acid, m being the number of acid groups of said protonic acid and α, which represents the number of salified amine groups per molecule of salt, has a value of at most $n+1$ in formula (I) and n in formula (II) said salt being present in sufficient amount to increase the utilization ratio of said excess amount of said oxide or hydroxide.

12. In a process for preparing a superbasic detergent additive that comprises (a) contacting sulfonic acid in a diluent oil which is a mineral oil or a synthetic oil of the ester, polyglycol, polyolefin or aromatic alkylate type, with an excess of oxide or hydroxide of a metal element selected from the group consisting of lithium and a metal of Group II A of the Periodic Classification, in the presence of a solvent system comprising a light aliphatic monohydric alcohol selected from the group consisting of methanol, isopropanol or n-butanol, and a liquid hydrocarbon selected from the group consisting of an aromatic hydrocarbon, a mixture of aromatic hydrocarbons, an aliphatic hydrocarbon of 5–15 carbon atoms, an oil cut boiling in the gasoline or white-spirit temperature range and a cycloaliphatic hydrocarbon, for a time sufficient to form the sulfonic salt of said metal element, (b) contacting the reaction mixture from step (a) with an amount of carbon dioxide sufficient and at a temperature sufficient to carbonate a substantial portion of the excess amount of said oxide or hydroxide without precipitating the carbonated product; (c) separating the uncarbonated fraction of said oxide or hydroxide from the reaction mixture; and (d) removing the volatile solvent components, wherein the improvement comprises employing in the reaction mixture of steps (a), (b), (c) and (d) at least one salt of the formula



(I)

or



(II)

where R is a substantially saturated aliphatic hydrocarbon radical containing from 20 to 250 carbon atoms, X is an alkylene radical of 2–5 carbon atoms the valences of which are located on separate carbon atoms, n is an interger from 1 to 5, Z^{m-} represents the anion of a protonic acid selected from the group consisting of a halohydric acid, a hydrocarbyl monocarboxylic acid of 1–24 carbon atoms, a hydrocarbyl dicarboxylic acid, and a hydrocarbyl polycarboxylic acid, m being the number of acid groups of said protonic acid and α, which is the number of amine groups salified in each salt molecule has a positive value of at most $n+1$ in formula (I) and n in formula (II), said salt being present in sufficient amount to increase the utilization ratio of said excess amount of said oxide or hydroxide.

4,059,537
PIEZOELECTRIC MATERIAL

Gerald P. Espinosa, Thousand Oaks, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Oct. 12, 1976, Ser. No. 731,160

Int. Cl.[2] C04B *35/46, 35/48*

U.S. Cl. 252—62.9 **1 Claim**

1. A piezoelectric material having the following approximate formula:

$$(Pb_{0.94}\ Bi_{0.06})_1\ (Zr_{0.432}\ Ti_{0.523}\ Ni_{0.02}\ Mn_{0.02})_1\ O_3,$$

and wherein the hysteresis of said material is less than 250 ppm and the temperature coefficient of resonant frequency between −60° C to 100° C is approximately 22 ppm per ° C.

4,059,538

METHOD FOR PREPARING GRANULATED DETERGENT FORMULATIONS

Robin John Green; Richard Shaw Johnson, both of Wirral, and John Kenneth Potter, Wallasey, all of England, assignors to Lever Brothers Company, New York, N.Y.

Continuation of Ser. No. 408,125, Oct. 19, 1973, abandoned. This application Mar. 1, 1976, Ser. No. 662,772
Claims priority, application Canada, Oct. 20, 1972, 48420
Int. Cl.² C11D 7/54
U.S. Cl. 252—95 8 Claims

1. A method of granulating a detergent formulation containing from about 2 to about 40% by weight of detergent active material, and from about 5 to about 60% by weight of detergency builder material to form granules in the range from about 0.3 mm to about 3.00 mm from detergent components in powder form, wherein the detergent components are formed into a substantially horizontal annular rotation bed within an apparatus comprising a roughened rotating table concentrically displaced within a smooth walled cylinder, and contacted with a compatible liquid binder that is released from a component during rotation of the formed bed.

4,059,539

(U,ZR)N ALLOY HAVING ENHANCED THERMAL STABILITY

Ralph A. Potter, Lynchburg, Va., and James L. Scott, Knoxville, Tenn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Continuation of Ser. No. 490,447, July 22, 1974, abandoned. This application Jan. 8, 1976, Ser. No. 647,477
Int. Cl.² G21C 3/58
U.S. Cl. 252—301.1 R 2 Claims

1. In a method of operating a nuclear reactor at a temperature at which UN fuel decomposes to free uranium, the improvement which comprises using a (U,Zr)N composition containing at least 2 and up to 10 weight percent Zr at a temperature in the range 1500°–1700° C. as a reactor fuel in said reactor said (U,Zr)N being a solid solution of ZrN in a solvent matrix of UN and having a homogeneous single-phase structure.

4,059,540

PROCESS FOR MAKING COLLOIDAL SOLS OF ANTIMONY PENTOXIDE IN POLAR ORGANIC SOLVENTS

Charles E. Crompton, Arlington Heights, Ill., and Abdulla M. Z. Kazi, Euclid, Ohio, assignors to Chemetron Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 605,606, Aug. 18, 1975, Pat. No. 4,017,418. This application Aug. 10, 1976, Ser. No. 713,156
The portion of the term of this patent subsequent to Apr. 12, 1994, has been disclaimed.
Int. Cl.² B01J 13/00
U.S. Cl. 252—309 6 Claims

1. A process for making a colloidal dispersion of hydrous antimony pentoxide particles comprising introducing particles of an oxidizable antimony oxide into a polar organic solvent selected from the group consisting of formamide, methylformamide, dimethyl formamide, acetamide, methylacetamide, dimethylacetamide, dimethyl sulfoxide, formic acid, tetramethyl urea, methanol and ethanol and contacting said particles with aqueous hydrogen peroxide in the presence of an aliphatic alpha-hydroxy carboxylic acid, and a halogen acid selected from the group consisting of hydrogen chloride and hydrogen bromide at a temperature of from about 0° C to about the decomposition temperature of the reaction mixture for a length of time sufficient to convert at least a portion of the oxidizable antimony oxide particles to colloidal particles of hydrous antimony pentoxide.

4,059,541

PLATINUM COLLOID SOL AND METHOD OF FORMING SAME

Henry G. Petrow, Watertown, and Robert J. Allen, Saugus, both of Mass., assignors to Prototech Company, Newton, Mass.

Division of Ser. No. 534,732, Dec. 20, 1974, Pat. No. 3,992,512, which is a continuation-in-part of Ser. No. 430,190, Dec. 28, 1973, abandoned, which is a continuation of Ser. No. 153,824, June 16, 1971, abandoned. This application May 6, 1976, Ser. No. 683,757
Int. Cl.² B01J 13/00
U.S. Cl. 252—313 R 9 Claims

1. A method of forming a platinum colloid sol of finely divided particles of average size of substantially 15–25 Angstroms, that comprises, oxidizing, by heating in air to dryness, a complex sulfite acid represented substantially by the empirical formula $H_3Pt(SO_3)_2OH$ to produce a black, glossy, oxidized material, and dispersing said glossy material in water.

4. A platinum colloidal sol of finely divided particles of oxidized complex platinum sulfite acid, said particles having an average size of substantially 15–25 Angstroms and being prepared in accordance with the method of claim 1.

7. A platinum colloidal sol consisting essentially of black, glossy, oxidized complex platinum sulfite acid dispersed in water, said oxidized acid being in the form of finely divided particles of average size of substantially 15–25 Angstroms.

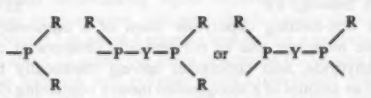
4,059,542

ORGANO-PHOSPHOROUS CATALYST COMPOSITION AND PROCESS FOR MAKING THE SAME

James Robert Jennings, and Lawrence Francis Michael Kelly, both of Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England

Filed May 10, 1976, Ser. No. 684,952
Claims priority, application United Kingdom, May 9, 1975, 19615/75
Int. Cl.² B01J 31/12, 31/02
U.S. Cl. 252—431 P 12 Claims

1. A catalyst composition, suitable for use in the dimerisation of acrylonitrile, consisting essentially of a matrix of a refractory metal oxide having chemically bonded to the surface thereof one or more organo phosphorus radicals of general formula



where groups R, which may be the same or different, present hydrocarbyl groups and Y represents either a divalent hydrocarbyl group or a direct link, the appropriate phosphorus atom or atoms of the compound being bonded to the matrix through the oxygen atom of one or more surface hydroxyl groups of the matrix.

4,059,543

CLINOPTILOLITE SORBENT

Joseph R. Klovsky, and Pramad B. Koradia, both of Kent, Ohio, assignors to Norton Company, Worcester, Mass.

Filed June 23, 1975, Ser. No. 589,070
Int. Cl.² B01J 29/06, 29/00
U.S. Cl. 252—455 Z 3 Claims

1. An acid gas sorbent consisting of clinoptilolite which has been ammonium exchanged to remove essentially all exchangeable metal cations and has been acid treated to increase the silica to alumina ratio to not greater than 11.5.

2. Natural clinoptilolite, in the hydrogen exchanged form, having a silica to alumina ratio greater than in the naturally occuring product but not greater than 11.5, and containing no exchangeable alkali or alkaline earth metal cations.

4,059,544

ACTIVE MATERIAL COMPOSITIONS WITH POROUS PROTECTIVE SHEATH AND METHOD FOR PREPARING

Yoshinobu Yamaguchi; Nanahiko Kitano, both of Nagoya; Yoshihisa Watanabe, and Makoto Imanari, both of Ami, all of Japan, assignors to Fujimi Kenmazai Kogyo Kabushiki Kaisha and Mitsubishi Petrochemical Co., Ltd., both of, Japan

Continuation of Ser. No. 386,294, Aug. 7, 1973, abandoned. This application Jan. 8, 1976, Ser. No. 647,558

Claims priority, application Japan, Aug. 10, 1972, 47-80252

Int. Cl.[2] B01J *23/34, 35/02*

U.S. Cl. 252—471 13 Claims

1. A structurally strong particulate composite of active materials comprising a core and a microporous sheath surrounding said core, said core containing the active material selected from group consisting of catalysts, adsorbants, microsieves, ion exchangers or mixtures thereof in particulate form and said microporous sheath consisting of a solid, strengthening, enclosing structure for said core having an open porous structure including communicating open pores forming passageways for access to said core from the space surrounding said sheathed composite, said porous structure resulting from sintering a sheath-forming material admixed with an organic material that is combustible at sintering temperatures, said sheath-forming material being a crystalline or amorphous inorganic salt or oxide selected from the group consisting of fused alumina, silicon carbide, alumina, silica, zirconia, feldspar, sodium glass, lead glass, borosilicate glass, Portland cement and amorphous alumina cements and said communicating open pores resulting from the combustion of said combustible organic material thereby providing voids comprising said passageways for access to said core from the space surrounding said particulate composite.

4,059,545

CROSSLINKED STYRENE POLYMER FOAM HAVING SUPPRESSED IGNITION PROPERTIES

John M. Corbett; Richard E. Skochdopole, both of Midland, and Anthony L. Scaggs, Sanford, all of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Dec. 22, 1975, Ser. No. 643,452

Int. Cl.[2] C08J *9/14, 9/36*

U.S. Cl. 260—2.5 FP 12 Claims

1. A non-melting copolymer foam of a monovinylidene aromatic monomer and an ethylenically unsaturated carboxylic anhydride, said copolymer having chemically bonded thereto an amount of a halogenated moiety containing chlorine and/or bromine sufficient to reduce the propensity of the copolymer to propagate combustion, said copolymer containing at least 1 milliequivalent of anhydride moiety per gram of copolymer, and said copolymer being crosslinked with a polyfunctional compound through the anhydride moiety to a degree sufficient to render it non-melting upon exposure to flame.

4,059,546

TEXTILE FIBER BLEND COMPRISING CELLULOSIC FIBERS AND ETHYLENE 2,6-NAPHTHALENE DICARBOXYLATE-HALOGENATED COMONOMERS COPOLYESTER FIBERS

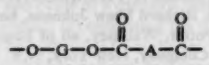
William N. Knopka, Wilmington, Del., assignor to Avtex Fibers Inc., Valley Forge, Pa.

Continuation-in-part of Ser. No. 328,043, Jan. 30, 1973, Pat. No. 3,874,155, and Ser. No. 328,044, Jan. 30, 1973, abandoned, and Ser. No. 328,045, Jan. 30, 1973. This application Aug. 3, 1973, Ser. No. 385,572

Int. Cl.[2] C08L *1/12*

U.S. Cl. 260—16 6 Claims

1. Copolyester resin textile fibers comprising linear, filament-forming, random copolyester resin of at least 75 mol % of ethylene-2,6-naphthalene dicarboxylate units and at least 3 mol % up to 25 mol % of copolymerized halogenated ester unit is represented by the general formula



wherein G is the residue of an alkylene glycol having from 2 to 10 carbon atoms, A is the residue of a saturated dicarboxylic acid selected from one of 2,5-dibromo-or 2,5-dichloroterephthalic acid, said ester unit present in an amount sufficient to provide at least 3.5% of the halogen, based on the weight of the copolyester, blended with flame-retardant cellulosic textile fibers in an amount of from about 10 to 90% copolyester fibers and from about 90 to 10% cellulosic fibers.

4,059,547

PAINT MANUFACTURE

Derek Norman Alfred Speakman, Ruislip, England, assignor to Imperial Chemical Industries Limited, United Kingdom

Division of Ser. No. 242,803, April 10, 1972, abandoned. This application May 23, 1975, Ser. No. 580,348

Claims priority, application United Kingdom, Apr. 15, 1971, 9494/71

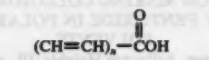
Int. Cl.[2] C08K *9/04*

U.S. Cl. 260—17 R 12 Claims

1. A pigment dispersion suitable for use in making a series of paints comprising a pigment, an organic liquid and a pigment dispersant which is a copolymer comprising units derived from the following ethylenically unsaturated monomers in the stated proportions by weight based on the total weight of the copolymer:

a. 0–50% of a hydroxy group-containing monomer, and/or
b. 0–20% of an amide group-containing monomer, provided that there is always present at least 5% of (a) or (b);
c. 20–80% of a monomer free from carboxyl groups and containing a straight or branched chain alkyl group of from 7 to 22 carbon atoms, and
d. a component containing one or more monomers free from the groups mentioned in (a), (b), or (c), said

component including as an essential constituent up to 20% based on the total weight of the copolymer of a comonomer containing an epoxide group, said epoxide group having been reacted with a compound bearing a carboxyl group and a pigment dispersant group and having the formula Ar



where Ar is an aromatic group and n is 1 or 0, the total amount of said component (d) being up to 50% and the total of monomers being 100%.

4,059,548

HEXAHYDROPYRIMIDINE-1,3-DIACETONITRILES AND PROCESSES FOR PREPARING THE SAME

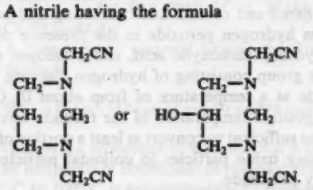
Roger Robert Gaudette, Hudson, N.H.; John Leonard Ohlson, Bedford, and Patricia Marie Scanlon, Arlington, both of Mass., assignors to W. R. Grace & Co., New York, N.Y.

Division of Ser. No. 630,791, Nov. 11, 1975, Pat. No. 3,988,367. This application July 7, 1976, Ser. No. 703,178

Int. Cl.[2] C07D *239/04*

U.S. Cl. 260—251 R 6 Claims

1. A nitrile having the formula



4,059,549

MOISTURE-HARDENABLE SEALING AND COATING COMPOUNDS

Bernd Brinkmann, Bad Zwischenahn, and Eugen Griebsch, Nordkirchen, both of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Germany

Filed May 13, 1976, Ser. No. 686,033
Claims priority, application Germany, May 16, 1975, 2521841
Int. Cl.[2] C09J 3/14, 3/16
U.S. Cl. 260—22 TN 10 Claims

1. A sealing and coating compound hardening in the presence of moisture and comprising a mixture of substantially equimolar amounts of

a. an addition product formed between an excess of a di- or poly-isocyanate having aliphatic or cycloaliphatic isocyanate groups and a polyester polyol or a linear or branched polyalkylene oxide having terminal hydroxy groups, and

b. a di- or poly-functional enamine which is prepared by reacting an aliphatic aldehyde or cyclic ketone and a polyaminoamide which is the condensation product formed between an excess of a di-secondary or primary-secondary diamine and at least one acid selected from the group consisting of di- and poly-carboxylic acids having 6 to 72 carbon atoms.

4,059,550

AQUEOUS DISPERSIONS OF POLYHYDROXY POLYETHER RESINS AND AMINOPLAST RESINS

David Alan Shimp, Prospect, Ky., assignor to Celanese Polymer Specialties Company, Louisville, Ky.

Filed July 6, 1976, Ser. No. 703,030
Int. Cl.[2] C08L 61/10, 61/28
U.S. Cl. 260—29.4 R 6 Claims

1. In an aqueous dispersion of a heat curable coating composition made from a mixture of a complex polyhydroxy polyether resin derived from an epihalohydrin and a dihydric phenol and having a melting point of at least 50° C. and an aminoplast or phenolplast resin, the improvement which comprises using as a catalyst for the curing reaction an adduct of phosphoric acid and a glycidyl polyether of a polyhydric phenol reacted in the ratio of about 1 mol of phosphoric acid per each epoxide group of the glycidyl polyether wherein the catalyst is present as an organic base salt of the adducted phosphoric acid and wherein about 0.1 to about 2 weight percent phosphoric acid, in the form of the adduct, is present as the catalyst, said weight percent being based on the total solids content, excluding pigmentation, of the coating composition.

4,059,551

MORTAR COMPOSITIONS

Davis S. Weiant, Moorestown, N.J.; Frank E. Bernett, Yardley, Pa., and William R. Velivis, Trenton, N.J., assignors to Tile Council of America, Inc., Princeton, N.J.

Continuation of Ser. No. 304,727, Nov. 8, 1972, Pat. No. 3,915,917, which is a continuation of Ser. No. 105,109, Jan. 8, 1971, abandoned. This application Sept. 4, 1974, Ser. No. 503,152
The portion of the term of this patent subsequent to Oct. 28, 1992, has been disclaimed.
Int. Cl.[2] C08L 61/24
U.S. Cl. 260—29.6 H 22 Claims

1. An aqueous mortar composition having a viscosity in the range of 10,000 to 1,200,000 cps comprising

a film-forming, room temperature cross-linkable polymer in the form of an emulsion, suspension, dispersion or partial solution, having substituents on the polymer chain selected from the group consisting of epoxy, hydroxy, methylol, carboxy, ester, α-olefin, isocyanate, methylol acrylamide, amino, N-methylol amide, internal double bond and combinations thereof, wherein said substituents are capable of reacting at room temperature to cross-link said polymer,

a water-insoluble filler selected from the group consisting of glass, quartz, silica, limestone, barytes, wollastonite, mica, flint powder, kryolite, alumina trihydrate, talc, pyrophyllite, zinc oxide and mixtures thereof, and

a cross-linking aid which is an acidic catalyst selected from the group consisting of inorganic and organic salts, organic acids, and amine acid-addition salts,

said polymer comprising from 2% to 16% by weight, and said filler from 50% to 90% by weight of the total aqueous composition and wherein said composition is a non-hydraulic mortar.

4,059,552

CROSS-LINKED WATER-SWELLABLE POLYMER PARTICLES

Maurice L. Zweigle, and Jack C. Lamphere, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 481,598, June 21, 1974, abandoned. This application Oct. 23, 1975, Ser. No. 625,297
Int. Cl.[2] C08L 33/02, 33/26, 41/00
U.S. Cl. 260—29.6 TA 15 Claims

1. A method for thickening an aqueous medium to obtain a composition having the properties of a viscous short solution and being resistant to viscosity degradation under conditions of high shear which comprises the step of thoroughly dispersing in said medium from about 0.1 to about 2 percent by weight of microbeads of a water-insoluble, water-swellable polymer of a water-soluble vinyl monomer or mixture of water-soluble vinyl monomers, cross-linked with a difunctional cross-linking agent copolymerizable with said monomer or monomers, said microbeads having diameters of from about 0.2 to about 4 microns and having a gel capacity of at least about 10 grams per gram in aqueous 0.27 molar sodium chloride solution, said cross-linking agent being present in an amount from about 50 to 1000 parts by weight of cross-linking agent per million parts of vinyl monomer or monomers in the polymer.

8. A viscous, short aqueous composition comprising an aqueous medium having dispersed therein from about 0.1 to about 2 percent by weight of microbeads of a water-insoluble, water-swellable polymer of a water-soluble vinyl monomer or mixture of water-soluble vinyl monomers, cross-linked with a difunctional cross-linking agent copolymerizable with said monomer or monomers, said microbeads having diameters of from about 0.2 to about 4 microns and having a gel capacity of at least about 10 grams per gram in aqueous 0.27 molar sodium chloride solution, said polymer being cross-linked with from about 50 to 1000 parts by weight of cross-linking agent per million parts of vinyl monomer or monomers in the polymer.

4,059,553

COATING COMPOSITION COMPRISING OXIDES AND/OR HYDROXIDES OF MG^{++}, CA^{++}, CHROMIUM, MANGANESE, AND ZN^{++} AND QUATERNARY AMMONIUM SILICATES USEFUL FOR BUILDING MATERIALS

Masao Tohyama; Minoru Ichigo, both of Nagoya; Takeshi Suzuki, Aichi; Makoto Nakasu, Iwakura; Akinobu Ando, Tajimi; Akitoshi Yoshida, Chiba; Masaharu Kosaka; Norihisa Hayasi, both of Ichikawa, and Shigeki Inoue, Funabashi, all of Japan, assignors to Kikusui Kagaku Kogyo Kabushiki Kaisha and Nissan Kagaku Kogyo Kabushiki Kaisha, both of Tokyo, Japan

Filed Apr. 20, 1976, Ser. No. 678,577
Claims priority, application Japan, Apr. 23, 1975, 50-49434
Int. Cl.[2] C08K 3/00; C08L 25/14; C04B 13/24; C08F 45/24
U.S. Cl. 260—29.6 S 11 Claims

1. A coating composition for building materials which comprises 100 parts by weight of a quaternary ammonium silicate having a silica content, calculated as SiO_2, of 5 to 70% by weight; 2 to 200 parts by weight of a metal compound selected

from the group consisting of oxides and hydroxides of magnesium, calcium, chromium, manganese and zinc and mixtures thereof; and water in a quantity sufficient to plasticize said composition.

4,059,554

STABILIZED EMULSION INKS

Thomas John Pacansky, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed May 28, 1976, Ser. No. 691,058
Int. Cl.² C08L *25/08*
U.S. Cl. 260—29.6 WQ 9 Claims

1. A stabilized alcohol or water in oil ink emulsion comprising:

a. a coloring amount of a pigment,

b. from 20–40% by weight resin of a block or graft copolymer having one type of polar segment miscible with water and alcohols of from 2 to 6 carbon atoms, and another type of non-polar segment which can be absorbed on the pigment and is miscible with non-polar components of the ink, said coploymer having a number average molecular weight from 20,000 to 40,000 and

a vehicle for said resin and pigment comprising a mixture of polar and non-polar solvents.

4,059,555

NOVEL AQUEOUS ADHESIVE

Hirosuke Imai, and Hiroyuki Ito, both of Yokohama, Japan, assignors to Nippon Oil Company Ltd., Tokyo, Japan

Continuation of Ser. No. 442,769, Feb. 15, 1974, abandoned. This application Dec. 31, 1975, Ser. No. 645,751
Claims priority, application Japan, Feb. 19, 1973, 48-19179
Int. Cl.² C08L *9/00*
U.S. Cl. 260—29.7 H 6 Claims

1. A water-soluble adhesive consisting essentially of an aqueous solution of a partly alkali metal modified butadiene-maleic anhydride copolymer wherein the free carboxylic acid groups and the carboxylic acid-alkali metal salt groups are contained in ratios of from 9 : 1 to 2.5 : 7.5, respectively, the partly alkali metal-modified copolymer being prepared from a starting butadiene-maleic anhydridecopolymer wherein the butadiene and maleic anhydride units are on the main chain and at least one alkali metal compound.

4,059,556

SPINNABLE SOLUTIONS CONTAINING CROSSLINKABLE COPOLYMERS OF ACRYLONITRILE AND N-METHYLOL ALKYL ETHER ACRYLAMIDES

Theo Neukam; Ulrich Reinehr, both of Dormagen; Francis Bentz, Cologne, and Günther Nischk, Dormagen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Jan. 19, 1977, Ser. No. 760,705
Claims priority, application Germany, Jan. 22, 1976, 2602350
Int. Cl.² C08F *2/00, 4/00, 220/70*
U.S. Cl. 260—30.2 1 Claim

1. A process for the production of spinnable solutions of crosslinkable copolymers of acrylonitrile which comprises solution polymerisation of at least 48% by weight of acrylonitrile, 0.5 to 12% by weight of a copolymerisable acid amide-N-methylol alkyl ether and, optionally, other copolymerisable comonomers in a strongly polar organic solvent and in the presence of a peroxodisulphate and a 1,3-diketone as catalyst system.

4,059,557

POLYMER DISPERSIONS

John Bentley, and Morice William Thompson, both of Maidenhead, England, assignors to Imperial Chemical Industries Limited, United Kingdom

Filed Apr. 19, 1976, Ser. No. 678,430
Claims priority, application United Kingdom, Apr. 24, 1975, 17060/75
Int. Cl.² C08K *5/01, 5/05, 5/07, 5/09*
U.S. Cl. 260—31.2 N 12 Claims

1. A process for the production of a stable dispersion of particles of a copolymer selected from the group consisting of copolyester, copolyamide and copolyesteramide in an inert organic liquid medium in which the copolymer is insoluble by the copolymerization of two or more reactive comonomers each of which is capable of undergoing homopolymerization and each of which is solid at the temperature at which the copolymerization reaction takes place and is insoluble in the liquid medium at that temperature, the process comprising the steps of (1) dispersing the solid comonomers in an inert organic liquid in the presence of at least one monomerstabilizing agent so as to produce stably dispersed particles of the comonomers having a mean diameter not greater than 50μ, each monomer-stabilizing agent being per se soluble in the inert organic liquid and incorporating (i) a polymeric component which is solvatable by the liquid and (ii) a grouping which is capable of becoming associated with the particles of solid comonomer and (2) heating the dispersion of solid comonomers at the copolymerization temperature so as to bring about the copolymerization reaction, in the presence of a copolymerstabilizing agent which is per se soluble in the inert organic liquid and incorporated (a) a polymeric component which is solvatable by the liquid and (b) a grouping which is capable of effecting association with the resulting copolymer as the copolymer is formed.

4,059,558

WATER FREE LIGHT SILICA AND SILICATE FILLERS FOR CROSS-LINKING ELASTOMERS

Paul Golombeck, Bornheim-Widdig, and Friedrich Hertl, Wesseling, both of Germany, assignors to Deutsche Gold- und Silber-Schneideanstalt vormals Roessler, Frankfurt, Germany

Division of Ser. No. 493,886, Aug. 1, 1974. This application Jan. 26, 1976, Ser. No. 652,058
Claims priority, application Germany, Aug. 27, 1973, 2343160
Int. Cl.² C08K *3/36;* C08L *7/00*
U.S. Cl. 260—42.33 15 Claims

1. A process comprising vulcanizing without the use of pressure a composition consisting essentially of (1) a vulcanizable elastomer, (2) a vulcanizing agent, and (3) a light filler selected from the group consisting of silica and silicates having a water content of not over 0.5% by weight and having a BET specific surface area of 25 to 300 m^2/g, said silica or silicate having been prepared by wet precipitation followed by drying until practically water free.

4,059,559

PROCESS FOR PREPARING N-TRIORGANOSILYLCARBAMIDE ACID ESTERS

Jürgen Burkhardt; Paul Hittmair, and Karl-Heinrich Wegehaupt, all of Burghausen, Germany, assignors to Wacker-Chemie GmbH, Munich, Germany

Filed Aug. 11, 1975, Ser. No. 603,413
Claims priority, application Germany, Oct. 7, 1974, 2447707
Int. Cl.² C07F *7/10*
U.S. Cl. 260—448.2 E 12 Claims

1. A process for preparing N-triorganosilylcarbamide acid esters which comprises reacting in the substantial absence of a solvent a carbamide acid ester having two hydrogen atoms linked to its nitrogen atom with a hexaorganodisilazane and a triorganohalosilane at a temperature of from 20° to 65° C. and thereafter separating the thus formed N-triorganosilylcarbamide acid ester from ammonium halide by-product.

4,059,560

SMOKE AND FLAME RETARDED STYRENE POLYMERS

David Francis Lawson, and Edward Leo Kay, both of Akron, Ohio, assignors to The Firestone Tire & Rubber Company, Akron, Ohio

Filed May 5, 1976, Ser. No. 683,571
Int. Cl.[2] C08K 3/18, 3/22, 3/24
U.S. Cl. 260—45.7 R 4 Claims

1. A smoke and flame inhibited composition containing (a) 100 parts by weight of a polymeric material selected from butadiene-styrene elastomer, high impact polystyrene, polystyrene and copolymers of styrene with a monoethylenically unsaturated nitrile, (b) 30–200 parts hydrated magnesium oxychloride per 100 parts said polymer, said copolymer containing at least 10% by weight aromatic groups derived from styrene.

4,059,561

FLAME-RESISTANT COMPOSITION CONTAINING A NORBORNENE DERIVATIVE POLYMER

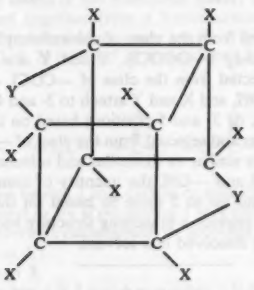
Fumio Arai, Machida; Masaaki Kira, Yokohama; Shiro Kokuryo, Yokohama, and Takashi Ueshima, Yokohama, all of Japan, assignors to Showa Denko Kabushiki Kaisha, Tokyo, Japan

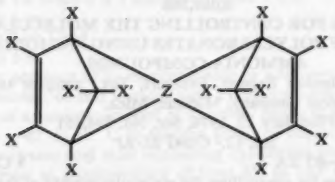
Filed Feb. 9, 1976, Ser. No. 656,266
Claims priority, application Japan, Feb. 7, 1975, 50-15280; Mar. 5, 1975, 50-26085
Int. Cl.[2] C08K 5/00
U.S. Cl. 260—45.8 R 46 Claims

1. A thermally stable, flame resistant composition comprising:

a. a ring-opening polymerization product of a norbornene derivative containing at least one polar group, and

b. a flame retarding compound in sufficient amounts to elevate flame resistance of said composition without reducing mechanical strength thereof, said flame retarding compound selected from the group consisting of a halogen-containing multicyclic compound of the formula (1) to (3) or a bromine-containing aromatic compound of the formula (4) to (6) as follows:


(1)


(2)

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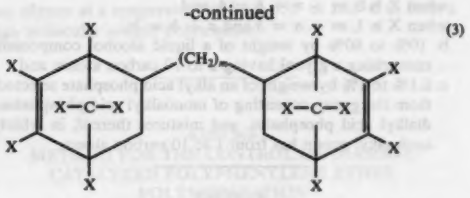
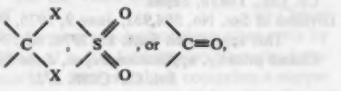
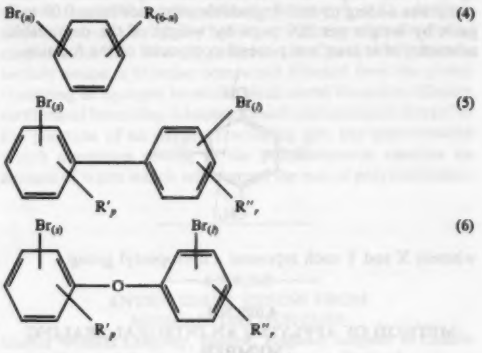

(3)

wherein X is chlorine or bromine, X′ is fluorine, chlorine, bromine, alkyl, or alkoxy having 1–20 carbon atoms,



Z is a tetravalent cyclic hydrocarbon group having at least five carbon atoms and *m* is an integer from 4–16:


(4)

(5)

(6)

wherein R is hydrogen, alkyl having 1–6 carbon atoms, bromoalkyl, or hydroxy wherein one R, but not more than one R, is hydroxy; R′ and R″ are hydrogen or alkyl having 1–6 carbon atoms; *n* is an integer from 3–6; *l*, *s*, *p* and *r* are each integers; the sum of *l* plus *s* is an integer from 2–10; and the sum of *l*, *s*, *p* and *r* is 10.

4,059,562

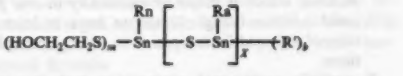
LIQUID STABILIZER SYSTEMS AND VINYL HALIDE RESIN COMPOSITIONS CONTAINING SAME

Samuel Hoch, Brooklyn; Mario Q. Ceprini, Cedarhurst, both of N.Y., and Emery Szabo, Freehold, N.J., assignors to Tenneco Chemicals, Inc., Saddle Brook, N.J.

Filed Mar. 21, 1977, Ser. No. 779,650
Int. Cl.[2] C08K 5/58
U.S. Cl. 260—45.75 S 25 Claims

1. A liquid stabilizer system for vinyl halide resin compositions that comprises

a. 40% to 90% by weight of an organotin ethanol mercaptide having the structural formula



wherein each R represents an alkyl group having 1 to 8 carbon atoms,

R′ represents —SCH_2CH_2OH, —SCH_2COOR'', or —SR″;

R″ represents an alkyl group having 6 to 18 carbon atoms;

a, *b*, *m*, and *n* each represents 1 or 2;

X represents 0 or 1;

when X is 0, $m + n + b = 4$; and
when X is 1, $m + n = 3$ and $a + b = 3$;

b. 10% to 60% by weight of a liquid alcohol component comprising a glycol having 2 to 10 carbon atoms; and

c. 0.1% to 1% by weight of an alkyl acid phosphate selected from the group consisting of monoalkyl acid phosphates, dialkyl acid phosphates, and mixtures thereof, in which each alkyl group has from 1 to 10 carbon atoms.

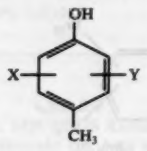
4,059,563

NOVEL PHENOL ANTIOXIDANTS

Kuniaki Goto, Tokyo; Harumi Asai, Kamakura, and Tadao Natsuume, Yokosuka, all of Japan, assignors to Nippon Zeon Co. Ltd., Tokyo, Japan

Division of Ser. No. 584,931, June 9, 1975, Pat. No. 4,008,284. This application Sept. 13, 1976, Ser. No. 722,826
Claims priority, application Japan, June 19, 1974, 49-69171
Int. Cl.² C08K 5/13
U.S. Cl. 260—45.95 H **6 Claims**

1. In a process for inhibiting the deterioration of degradable polymeric and oily substances by adding an antidegradation agent to said degradable substance the improvement which comprises adding to said degradable substance from 0.01 to 5 parts by weight per 100 parts by weight of the degradable substance of at least one p-cresol compound of the formula:



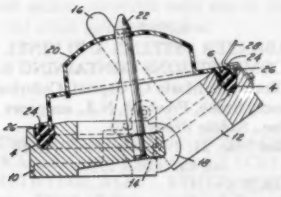
wherein X and Y each represent a cyclopentyl group.

4,059,564

METHOD OF APPLYING AN INTEGRAL SEALING MEMBER

Standly T. Coughlan, Huron, Ohio; John H. Dewar, and Henry A. Zampa, both of Grosse Ile, Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed May 27, 1975, Ser. No. 581,254
Int. Cl.² B29D 27/00
U.S. Cl. 264—46.4 **8 Claims**



1. A method for applying an integral sealing member to a non-planar surface member comprising:

A. dispensing an elastomer composition adapted to be cured to form said sealing member into a groove in a mold member which is disposed essentially in one plane; said mold member being adapted to have at least a portion thereof adjusted from a planar to various non-planar positions;

B. partially curing said composition such that it does not flow;

C. adjusting the disposition of at least a portion of said mold member having said groove therein and containing said partially cured composition such that said groove is no longer disposed in one plane and such that said nonplanar surface member may be embedded within the composition within said groove along the entire portion thereof to which said sealing member is to be applied;

D. positioning said non-planar surface member within said groove containing said partially cured composition such that at least a portion thereof is embedded therein along the entire portion thereof to which said sealing member is to be applied;

E. completing the curing of said composition; and

F. removing said non-planar surface with said sealing member integrally bonded thereto from said groove.

6. A process in accordance with claim 1 wherein said material is a foamable elastomeric material.

4,059,565

PROCESS FOR PRODUCING A BRANCHED POLYCARBONATE OR POLY(ESTER-CARBONATE)

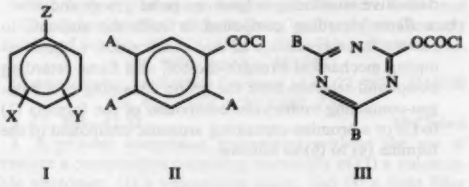
Hiroyuki Yoshizaki, Toyonaka; Hiromitsu Takanihashi, Takarazuka, and Yoshitaka Masuda, Toyonaka, all of Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

Filed June 9, 1976, Ser. No. 694,294
Claims priority, application Japan, June 16, 1975, 50-72921; June 16, 1975, 50-72922; June 19, 1975, 50-74768
Int. Cl.² C08G 63/62
U.S. Cl. 260—47 XA **7 Claims**

1. In a process for producing a branched polycarbonate or poly(ester-carbonate) by reacting a combination of a monomer component composed of an aromatic dihydroxy compound (A) or a mixture of an aromatic dihydroxy compound (A) and a dibasic acid derivative (B), and a polyfunctional organic compound (C), with a compound of the formula

COM_2

where M is selected from a class of chloro and phenoxy, the improvement which comprises using, as the polyfunctional organic compound (C), a member selected from the compounds I, II, and III of the formulas



I II III

where Z is selected from the class of chloroformyl (—COCl) and chloroformyloxy (—OCOCl), X and Y are similar or dissimilar and selected from the class of —COCl, —OCOCl, —OH and —COOH, and X and Y attach to 2- and 4-positions, 3- and 4-positions, or 3- and 5-positions based on the Z; A is similar or dissimilar and selected from the class of —COCl and —COOH; and B is similar or dissimilar and selected from the class of —OCOCl and —OH, the quantity of compound (C) being sufficient and up to 2 mole % based on the moles of compound (A) to provide a branching structure and to permit the polymer to be dissolved in a solvent.

4,059,566

PROCESS FOR CONTROLLING THE MOLECULAR WEIGHT OF POLYCARBONATES USING AMMONIA OR AMMONIA COMPOUNDS

Joseph McClendon Baggett, Freeport, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed July 12, 1976, Ser. No. 704,151
Int. Cl.² C08G 63/62
U.S. Cl. 260—47 XA **5 Claims**

1. A process for controlling the molecular weight of thermo-

plastic aromatic polycarbonates which comprises reacting under interfacial polycarbonate-forming conditions

1. a carbonyl halide,
2. a dihydric phenol or mixtures of dihydric phenols,
3. a catalyst useful to form polycarbonates, and
4. a chain terminating amount of a compound selected from the group consisting of ammonia or an ammonium compound which liberates ammonia under the conditions of the reaction.

4,059,567

HIGH MOLECULAR WEIGHT POLYTRIAZINES OF SOLUBLE POLYMERIC N-CYANO-ISOUREA ETHERS

Rudolf Sundermann, New Martinsville, W. Va.; Günther Rottloff, Cologne, and Ernst Grigat, Odenthal-Gloebusch, both of Germany, assignors to Bayer Aktiengesellschaft, Germany

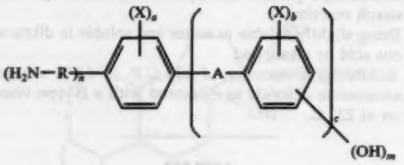
Filed July 22, 1976, Ser. No. 707,553

Claims priority, application Germany, July 24, 1975, 2533121

Int. Cl.² C08G *73/08*

U.S. Cl. 260—47 R **2 Claims**

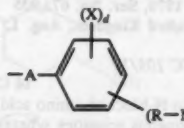
1. A process for producing a high molecular weight polytriazine which comprises reacting (1) a compound of the formula



wherein

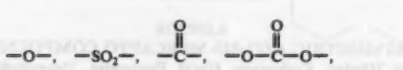
R is a bond, alkylene having 1 to 9 carbon atoms or said alkylene substituted by phenyl or by alkyl having 1 to 4 carbon atoms;

X is hydrogen, halogen, alkyl having 1 to 9 carbon atoms,



or phenyl, or two X substituents together on adjacent carbon atoms of the phenylene moiety to which they are attached together from a hydrocarbon ring containing from 5 to 6 carbon atoms or together form in conjunction with O, S, N or P a 5 or 6-membered heterocyclic ring;

A is



alkylene having 1 to 9 carbon or said alkylene substituted by phenyl or by alkyl having 1 to 4 carbon atoms, a 5 or 6-membered cycloaliphatic or aromatic ring or a bond;

n is 1, 2 or 3;

m is 1, 2 or 3;

a is 5-*n* when *c* is 1 and 6-*m*-*n* when *c* is 0;

b is 5-*m*;

c is 0 or 1 and

d is 5-*n*

in the presence of an inorganic base or a tertiary amine or (2) a phenolate of said formula with cyanogen halide in the presence of a catalytic amount of a tertiary amine at a temperature from −40° to 65° C to thereby form the corresponding aromatic cyanic acid ester containing cyanamide groups; heating said ester at a temperature of from 65° to 150° C to thereby form a prepolymer soluble in organic solvents and heating said prepolymer at a temperature of from 150° to 350° C to form a high molecular weight polytriazine.

4,059,568

METHOD FOR THE CONTROL OF DIAMINE CATALYZED POLYPHENYLENE ETHER POLYMERIZATION

Glenn Dale Cooper, Delmar, N.Y., assignor to General Electric Company, Pittsfield, Mass.

Filed Aug. 30, 1976, Ser. No. 718,836

Int. Cl.² C08G *65/44*

U.S. Cl. 260—47 ET **19 Claims**

1. In a process for forming a polyphenylene ether resin by the oxidative coupling of a 2,6-disubstituted phenolic compound in the presence of a catalyst which comprises a copper compound, a diamine of the formula:

wherein each R^1 is independently isopropyl, a C_{4-8} tertiary alkyl or a cycloalkyl group having no hydrogens on the alpha-carbon atom and R^2 is C_{2-4} alkylene or C_{3-7} cycloalkylene; a tertiary amine, a bromine compound selected from the group consisting of hyrogen bromide, alkali metal bromides, alkaline earth metal bromides, 4-bromophenols and mixtures thereof in the presence of an oxygen containing gas, the improvement which comprises adding to the polymerization reaction an amount of water which will control the rate of polymerization.

4,059,569

ANTIOXIDANT RESINS FROM MERCAPTOALDEHYDES

Gerald William Langsley, Baslow, England, assignor to Coalite and Chemical Products Limited, Bolsover, England

Filed Sept. 22, 1976, Ser. No. 725,512

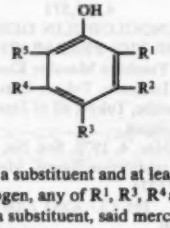
Claims priority, application United Kingdom, Oct. 9, 1975, 41527/75

The portion of the term of this patent subsequent to Oct. 12, 1993, has been disclaimed.

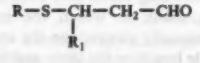
Int. Cl.² C08G *75/04*

U.S. Cl. 260—48 **22 Claims**

1. A sulphur containing resin which is the condensation product of (i) one or more mercaptoaldehydes and (ii) one or more meta-substituted phenols, or a mixture of one or more meta-substituted phenols and one or more other phenols wherein the meta-substituted phenol has the general formula:



in which R^2 denotes a substituent and at least one of R^1, R^3, R^4, and R^5 denote hydrogen, any of R^1, R^3, R^4 and R^5 not denoting hydrogen denoting a substituent, said mercaptoaldehydes having the general formula:



in which R is a C_1 – C_{17} straight or branched alkyl group and R_1 denotes hydrogen or a C_1 – C_4 alkyl group.

4,059,570

POLYTHIOETHER POLYURETHANES AND THEIR PREPARATION

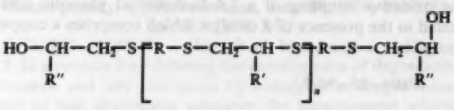
Alexis A. Oswald, Mountainside, N.J., assignor to Exxon Research & Engineering Co., Linden, N.J.

Division of Ser. No. 516,088, Oct. 18, 1974, Pat. No. 3,954,723, which is a continuation-in-part of Ser. No. 326,108, Jan. 23, 1973, abandoned, which is a division of Ser. No. 47,109, June 17, 1970, Pat. No. 3,717,618, which is a continuation-in-part of Ser. No. 541,696, April 11, 1966, Pat. No. 3,592,798. This application May 4, 1976, Ser. No. 682,840

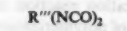
Int. Cl.[2] C08G *18/06*

U.S. Cl. 260—77.5 AP 8 Claims

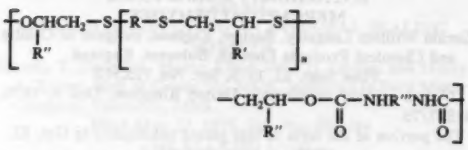
1. Process for the preparation of polythioether polyurethanes comprising reacting a polythioether diol of the formula



wherein R'' is hydrogen or methyl, R is a C_1 to C_{30} divalent organic radical; R' is selected from the group consisting of H, C_1–C_{30} alkyl, C_2–C_{30} alkenyl, C_2–C_{30} alkynyl, C_7–C_{20} aralkyl and mixtures thereof, providing that either R has a branched structure or R' is alkyl and *n* is 2 to 1000, with a diisocyanate of the formula



wherein R''' is phenylene, tolylene, xylylene, diphenylmethane, chlorophenylene, C_2 to C_{16} polymethylene and polymethylene groups interrupted by thioether sulfur, to yield a product of the repeating structure



4,059,571

NOVEL IMMUNOGLOBULIN DERIVATIVES AND PROCESS FOR THE PREPARATION THEREOF

Katsuhiko Tomibe; Yasuhiko Masuho; Kimihiko Matsuzawa, all of Hino; Sachio Ishimoto, Tokyo; Kazuo Satake, Kawasaki, and Tsuneo Watanabe, Tokyo, all of Japan, assignors to Teijin Limited, Osaka, Japan

Filed Mar. 4, 1975, Ser. No. 555,132

Claims priority, application Japan, Mar. 8, 1974, 49-26341; June 24, 1974, 49-71274

Int. Cl.[2] A23J *1/06*

U.S. Cl. 260—112 B 13 Claims

1. Novel immunoglobulin derivatives which are substantially free from oxidizing metal ions such as cupric ion comprising immunoglobulin in which the interchain disulfide bonds are predominantly cleaved, on the average 3 to 5 of the interchain disulfide bonds or the inter- and intra-chain disulfide bonds being cleaved, and so produced sulfur atoms (S—) are S-sulfonated (-S-SO_3).

4,059,572

MUCOPOLYSACCHARIDE HAVING FLOCCULATING ACTIVITY OF PROTEIN AND METHOD FOR PRODUCING THE SAME

Junji Nakamura, Tokyo; Shigeyoshi Miyashiro, Kawasaki; Yoshio Hirose, Fujisawa, and Takeyoshi Awao, Kawasaki, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Filed Apr. 4, 1975, Ser. No. 565,077

Claims priority, application Japan, Apr. 9, 1974, 49-40298

Int. Cl.[2] C12D *13/06*

U.S. Cl. 260—112 R 2 Claims

1. A mucopolysaccharide having flocculating activity for protein which is inactivated by treatment with a protease or with periodic acid characterized by the following chemical and physical properties:

1. The ultraviolet spectrum of FIG. 1;
2. The infrared spectrum of FIG. 2;
3. Containing carbon, hydrogen, oxygen and nitrogen;
4. Containing the following moieties: glutamic acid, tyrosine, valine, serine, leucine, aspartic acid, isoleucine, alanine, phenylalanine, proline, galactosamine, glucosamine, and 2-ketogluconic acid;
5. Having a molecular weight by the gel filtration method greater than 2×10^5;
6. Exhibiting a positive Lowry reaction and a negative iodo starch reaction;
7. Being slightly soluble in water and soluble in dilute aqueous acid or alkali; and
8. Exhibiting a viscosity of 400 C.P. in 1.0% solution in ammonium chloride as measured with a B-type viscometer at 22° C.

4,059,573

EXTRACTION OF N-BLOCKED AMINO ACIDS FROM AQUEOUS MEDIA

Colin Robinson, Grange-over-Sands, and Derek Walker, Windermere, both of England, assignors to Glaxo Laboratories Limited, Greenford, England

Continuation of Ser. No. 491,856, July 25, 1974, abandoned. This application Mar. 30, 1976, Ser. No. 671,935

Claims priority, application United Kingdom, Aug. 1, 1973, 36498/73

Int. Cl.[2] C07C *103/52*

U.S. Cl. 260—112.5 R 14 Claims

1. In a process for extracting an N-blocked amino acid from a fermentation broth or other aqueous solutions wherein the improvement comprises treating a fermentation broth or other predominantly aqueous solutions containing an N-blocked amino acid with a diazoalkane in the presence of a water immiscible organic solvent to substantially simultaneously esterify said N-blocked amino acid and produce a solution of the thus formed ester in said water immiscible organic solvent.

4,059,574

SYMMETRIC AZO-BIS-MERCAPTO COMPOUNDS

Otto Hitzler, Erzhausen; Horst Pennewiss, Darmstadt-Neu-Kranichstein; August Froelich, Darmstadt-St. Stephen-Siedlung; Gerhard Markert, Ober-Ramstadt-Eiche, and Winfried Wunderlich, Rossdorf, all of Germany, assignors to Rohm GmbH, Darmstadt, Germany

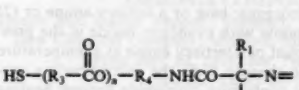
Filed Apr. 20, 1976, Ser. No. 678,699

Claims priority, application Germany, Apr. 26, 1975, 2518622

Int. Cl.[2] C07C *107/02;* C08L *67/06;* C10L *1/14*

U.S. Cl. 260—192 4 Claims

1. A symmetric azo-bis-mercapto compound of the formula



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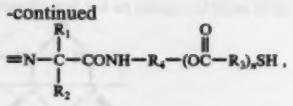


wherein R_1 and R_2 are methyl or ethyl, R_3 and R_4 are the same or different alkylene having 1 to 4 carbon atoms, and n is 0 or 1.

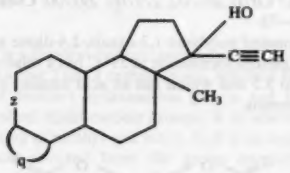
4,059,575

PROCESS FOR THE PREPARATION OF 17(20)ENE-21-STEROID ALDEHYDES

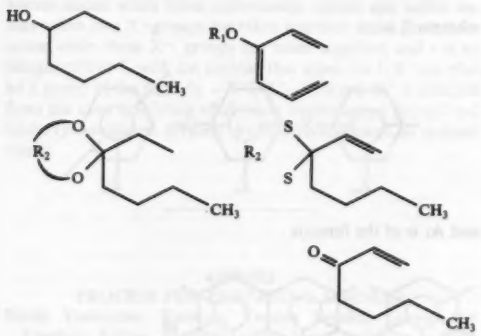
Kathlyn A. Parker, Providence, R.I., and Raymond W. Kosley, Jr., Convent Station, N.J., assignors to Research Corporation, New York, N.Y.

Filed Apr. 22, 1976, Ser. No. 679,152
Int. Cl.² C07J 33/00, 21/00
U.S. Cl. 260—239.5 **18 Claims**

1. A process which comprises reacting a cyclopenta deca hydro(a)naphthalene of the formula

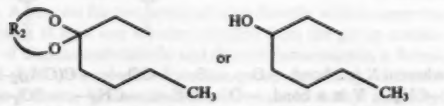


wherein —Z— is a carbon carbon single bond or a carbon carbon double bond and q is selected from the group consisting of

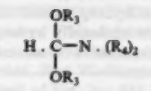


where R_1 is lower alkyl, phenyl or phenyl loweralkyl, R_2 is loweralkyl

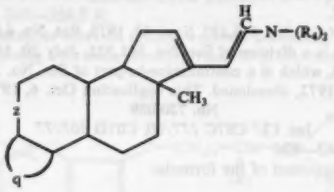
provided that where q is



z is a carbon carbon double bond and for the other values of q. z is a carbon carbon single bond with an excess of a diloweralkyl formamide diloweralkylacetal, wherein the term loweralkyl indicates an alkyl moiety of 1 to 5 carbon atoms



where R_3 and R_4 are loweralkyl and may be the same or different to yield the corresponding dienamine of the formula



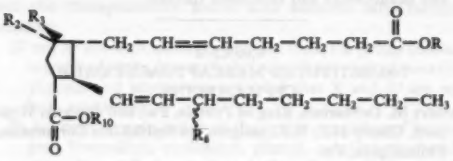
4,059,576

11-SUBSTITUTED PROSTAGLANDINS

George William Holland, Cedar Grove; Jane Liu Jernow, Verona, and Perry Rosen, North Caldwell, all of N.J., assignors to Hoffmann-La Roche, Inc., Nutley, N.J.

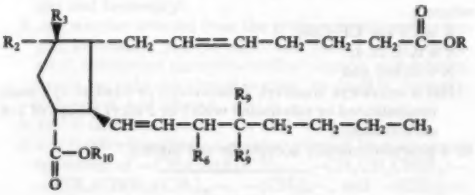
Division of Ser. No. 480,458, June 18, 1974, which is a continuation-in-part of Ser. No. 386,117, Aug. 6, 1973, abandoned. This application Sept. 17, 1975, Ser. No. 614,051
Int. Cl.² C07C 177/00
U.S. Cl. 542—426 **7 Claims**

1. A compound of the formula:



wherein
R is hydrogen or lower alkyl;
R_{10} is lower alkyl;
R_2 is hydroxy;
R_3 is hydrogen;
R_6 is tetrahydropyranyloxy, benzyloxy, 4-methoxy-5,6-dihydropyranyloxy, benzhydryloxy, trityloxy, trialkylsilyloxy or methoxymethyl; and the dotted bond can be optionally hydrogenated;
or its optical active enantiomers or racemates thereof.

3. A compound of the formula:



wherein
R is hydrogen or lower alkyl;
R_2 is hydroxy;
R_3 is hydrogen
R_6 is hydroxy, tetrahydropyranyloxy, benzyloxy, 4-methoxy-5,6-dihydro-2H-pyranyloxy, benzhydryloxy, trityloxy, trialkylsilyloxy and methoxymethyl;
R_9 is lower alkyl or fluoro;

R_9' is hydrogen or lower alkyl;
R_{10} is lower alkyl or hydrogen; and the dotted carbon to carbon bond can be optionally hydrogenated
or its optical active enantiomers or racemates thereof.

4,059,577

SYNTHESIS OF CYCLOPENTANOL

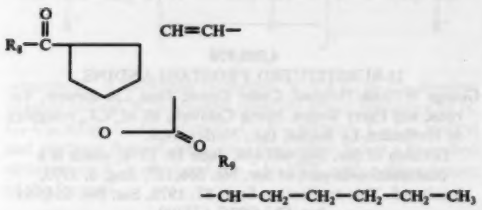
Frank Kienzle, Therwil, Switzerland, and Perry Rosen, North Caldwell, N.J., assignors to Hoffmann-La Roche, Inc., Nutley, N.J.

Division of Ser. No. 613,137, Sept. 15, 1975, Pat. No. 4,005,110, which is a division of Ser. No. 381,322, July 20, 1973, abandoned, which is a continuation-in-part of Ser. No. 300,633, Nov. 25, 1972, abandoned. This application Oct. 6, 1976, Ser. No. 730,059

Int. Cl.[2] C07C *177/00*; C07D *307/77*

U.S. Cl. 542—426 **1 Claim**

1. A compound of the formula:



wherein R_9 is lower alkanozloxy, benzoyloxy, benloxy or tetrahydropyranyloxy
and enantiomers and racemates thereof.

4,059,578

7-SUBSTITUTED MERCAPTOACETAMIDO CEPHAMYCINS

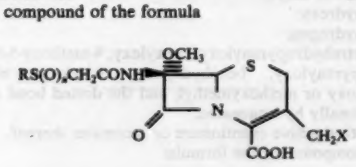
Robert M. DeMarinis, King of Prussia, Pa., and Jerry A. Weisbach, Cherry Hill, N.J., assignors to SmithKline Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 504,619, Sept. 9, 1974, abandoned. This application Jan. 13, 1975, Ser. No. 540,482

Int. Cl.[2] C07D *501/50*; A61K *31/545*

U.S. Cl. 544—21 **10 Claims**

1. A compound of the formula



wherein
R is CF_3 or CF_3CH_2;
n is 0, 1, or 2;
X is SHet; and
Het is tetrazolyl, triazolyl, thiadiazolyl, or oxadiazolyl, each unsubstituted or substituted with 1 or 2 alkyl groups of 1–4 carbon atoms,
or a pharmaceutically acceptable salt thereof.

4,059,579

MORPHOLENONE DERIVATIVES

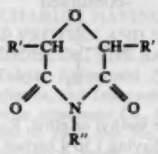
Dennis A. Ruest, Manchester; Roger L. Kidwell, Kirkwood, and Chung Y. Shen, St. Louis, all of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Oct. 10, 1974, Ser. No. 513,792

Int. Cl.[2] C07D *295/00*

U.S. Cl. 544—172 **3 Claims**

1. A compound represented by the formula:



wherein R′ is selected from the group consisting of hydrogen and COOM′, M′ being alkali metal, ammonium or one-half magnesium, hydrogen, or alkyl radicals containing 1 to 12 carbon atoms, provided that at least one R′ substituent is COOM′ and R″ is selected from the group consisting of alkyl radicals containing from 1 to 12 carbon atoms, phenyl and COOM, M being alkali metal; and, the O-carboxylates of the said imide carboxylates.

4,059,580

SULPHONATED POLYBENZ-1,3-OXAZIN-2,4-DIONES

Klaus Elfert; Jurgen Hinz, and Rudolf Binsack, all of Krefeld, Germany, assignors to Bayer Aktiengesellschaft, Germany

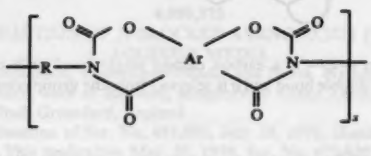
Filed Aug. 10, 1976, Ser. No. 713,143

Claims priority, application Germany, Aug. 16, 1975, 2536491

Int. Cl.[2] C07D *265/00, 273/00, 295/00*; C08F */00*

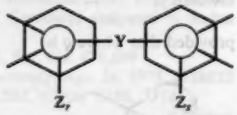
U.S. Cl. 544—73 **4 Claims**

1. A sulphonated polybenz-1,3-oxazin-2,4-dione whose 0.5% solution in dimethyl formamide at 25° C has a relative viscosity of from 0.7 to 3.5 and which has an acid number of from 1 to 800 of the formula



wherein R is

and Ar is of the formula



wherein X is a bond, —O—, —S—, $—SO_2—$, $—C(CH_3)_2—$ or $—CH_2—$; Y is a bond, —O—, —S—, $—CH_2—$, $—SO_2—$ or —CO—; Z is $—SO_3H$ or a radical of a sulphonic acid salt of an alkali or alkaline earth metal; *m, n, o, p, q, r* and *s* are the same or different, and *m* and *n* represent 0 or an integer from 1 to 4, *o, p* and *q* represent 0, 1 or 2, and *r* and *s* represent 0 or an integer from 1 to 3; with the proviso that *m, n, o, p, q, r* and *s*

cannot all be 0 simultaneously; and *x* is an integer of from 10 to 200.

4,059,581

HETEROCYCLIC NITROGEN CONTAINING SILOXANES

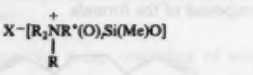
Bela Prokai, Mahopac, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 219,120, Jan. 19, 1972, abandoned, which is a division of Ser. No. 887,428, Dec. 22, 1969, Pat. No. 3,658,867. This application May 16, 1975, Ser. No. 578,091

Int. Cl.[2] C07F *7/04*

U.S. Cl. 544—69 **20 Claims**

1. A cationic bis(trimethylsiloxy) siloxane having the formula $MD_x'M$ wherein M is a trimethylsiloxy unit, $Me_3SiO_{\frac{1}{2}}$, *x* is an integer of 1 to 3 and D' is a cationic difunctional unit having the formula:



wherein R° is a divalent organic group, free of aliphatic unsaturation and having 2 to 18 carbon atoms, selected from the class consising of divalent hydrocarbon groups and hydroxy-substituted divalent hydrocarbon groups; R is selected from the class consisting of methyl and ethyl; R_2N is an organic heterocyclic radical selected from the group consisting of morpholinium, piperdinum, pyrrolium, and piperazinium, said heterocyclic radical being bonded through the N atom in the above formula to the R and R° groups; X is an anion selected from the class consisting of chlorine, iodine, bromine, aryl sulfonate having 6 to 18 carbon atoms, nitrate, nitrite and borate anions when taken individually, sulfate and sulfite anions when two X^- groups are taken together and a phosphate anion when three X^- groups are taken together; and *t* is an integer of 0 to 1, with the proviso that when *t* is 1, R° can also be a group of the formula —R"OR"— wherein R" is selected from the class consisting of divalent hydrocarbon groups and hydroxy-substituted divalent hydrocarbon groups as defined above.

4,059,582

PROCESS FOR PREPARING ADENINE

Eiichi Yonemitsu, Kashiwa; Tomiya Isshiki, Tokyo, and Yasuhiko Kijima, Matsudo, all of Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

Filed July 24, 1975, Ser. No. 598,697

Claims priority, application Japan, July 31, 1974, 49-87818; Sept. 24, 1974, 49-109720

Int. Cl.[2] C07D *473/34*

U.S. Cl. 260—252 **13 Claims**

1. A process for preparing adenine directly which comprises reacting at least one member selected from the group consisting of diaminomaleonitrile and diaminofumaronitrile, a formic acid derivative selected from the group consisting of ammonium formate, formamide, orthoformic acid methyl and ethyl esters, and formic acid methyl and ethyl esters, and at least one member selected from the group of ammonia and ammonium salts in the presence or absence of a solvent, the amount of formic acid derivative being not less than 100 g per mole of nitrile.

4,059,583

SUBSTITUTED INDOLES

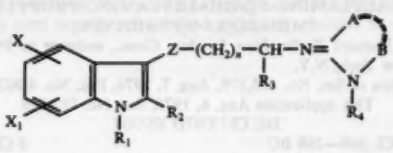
David Fred McComsey, Philadelphia, and Michael John Zelesko, Warminster, both of Pa., assignors to McNeil Laboratories, Incorporated, Fort Washington, Pa.

Continuation-in-part of Ser. No. 631,798, Nov. 13, 1975, abandoned, which is a continuation-in-part of Ser. No. 537,612, Dec. 30, 1974, abandoned. This application Oct. 13, 1976, Ser. No. 731,866

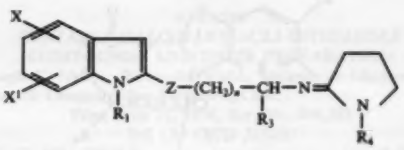
Int. Cl.[2] C07D *209/30*

U.S. Cl. 260—256.5 R **35 Claims**

1. A member selected from the group consisting of a compound having a formula selected from the group consisting of:



and



and the therapeutically active acid addition salts thereof, wherein:

X and X^1 are each members selected from the group consisting of hydrogen, loweralkyl, loweralkoxy, halo, loweralkylamino and acylamino; provided that X and X^1 are not both acylamino;

R_1 is a member selected from the group consisting of hydrogen, loweralkyl, cycloalkyl, phenyl, substituted phenyl, phenylloweralkyl, substituted phenylloweralkyl wherein said substitution is on only the phenyl portion, loweralkoxyloweralkyl, alkenyl, alkynyl, cycloalkylloweralkyl, and cycloalkenyl;

R_2 is a member selected from the group consisting of hydrogen, loweralkyl, phenyl, biphenyl, naphthyl, substituted phenyl, heterocyclic aryl, phenylloweralkyl, and substituted phenylloweralkyl wherein said substitution is on only the phenyl portion;

Z is a member selected from the group consisting of thio, sulfinyl, and sulfonyl;

n is the integer 1, 2, or 3;

R_3 is a member selected from the group consisting of hydrogen and loweralkyl;

R_4 is a member selected from the group consisting of hydrogen, loweralkyl, phenyl, substituted phenyl, phenylloweralkyl, substituted phenylloweralkyl wherein said substitution is on only the phenyl portion, cycloalkyl, hydroxyloweralkyl, and alkenyl;

A and B taken individually are each loweralkyl;

A and B taken together is a member selected from the group consisting of $—CH_2CH(R_5)CH_2—$, $—CH_2CH_2CH(R_5)—$, $—N(R_6)CH(R_5)(CH_2)_m—$, $—(CH_2)_4—$, and $—(CH_2)_5—$, said R_5 being a member selected from the group consisting of hydrogen, loweralkyl, phenyl, and substituted phenyl, said R_6 being a member selected from the group consisting of hydrogen and lower-alkyl, and said *m* being 1 or 2; provided that when *m* is 2,

R_5 is H; said cycloalkyl having from 3 to about 8 carbon atoms, said alkenyl having from 2 to about 5 carbon atoms; said alkynyl having from about 2 to about 5 carbon atoms; said cycloalkenyl having from 5 to about 7 carbon atoms;

said cycloalkylloweralkyl having from 3 to about 8 carbon atoms in its cycloalkyl portion and from 1 to about 5 carbon atoms in its loweralkyl portion; said acyl consisting of loweralkyl carboxy radicals, phenyl carboxy radicals, and substituted phenyl carboxy radicals; said substituted phenyl being phenyl substituted with from 1 to 3 members each selected from the group consisting of loweralkyl, loweralkoxy, and halo; and said heterocyclic aryl comprising 5- to 10-membered heteroaromatics wherein the hetero atoms are one or more thia, aza or oxa atoms.

4,059,584

2-ACYLAMINO-3-[3-(DIALKYLAMINO)PROPYL]-IMIDAZO[4,5-B]PYRIDINES

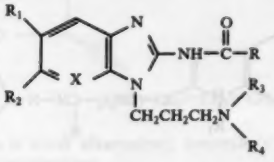
Saul Bernard Kadin, New London, Conn., assignor to Pfizer, New York, N.Y.

Division of Ser. No. 495,375, Aug. 7, 1974, Pat. No. 4,002,623. This application Aug. 6, 1976, Ser. No. 712,225

Int. Cl.² C07D *487/04*

U.S. Cl. 260—268 BC **5 Claims**

1. A compound having the formula:



and the pharmaceutically acceptable acid addition salts thereof wherein R is styryl, chlorostyryl, phenyl, or mono- or disubstituted phenyl wherein each substitutent is chloro, bromo, fluoro, trifluoromethyl, phenyl, alkoxy or alkyl, said alkoxy or alkyl having from 1 to 4 carbon atoms; R_1 and R_2 are each hydrogen, chloro, bromo, fluoro, trifluoromethyl, methoxy or methyl; X is nitrogen; and R_3 and R_4 when taken separately are each alkyl having from 1 to 4 carbon atoms and when taken together with the nitrogen to which they are attached form piperidino, pyrrolidino, morpholino, piperazino, 4-benzylpiperazino or 4-alkylpiperazino, said alkyl having from 1 to 4 carbon atoms.

4,059,585

PROCESS FOR PREPARING AN INTERMEDIATE FOR CNS DEPRESSANTS

Francois T. Bruderlein, Montreal, Canada, assignor to Ayerst McKenna and Harrison Ltd., Montreal, Canada

Filed July 27, 1976, Ser. No. 709,144

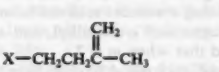
Int. Cl.² C07D *217/10*

U.S. Cl. 260—286 Q **9 Claims**

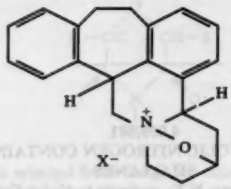
1. A process for preparing (4a,13b-trans)-1,2,4,4a,8,9,13b,14-octahydro-3H-benzo[6,7]cyclohepta[1,2,3-de]pyrido[2,1-a]isoquinolin-3-one, comprising:

a. oxidizing 1,7,8,12b-tetrahydrobenzo[1,2]cyclohepta[3,4,5-de]-isoquinoline with a peracid oxidizing agent to obtain 1,7,8,12b-tetrahydrobenzo[1,2]cyclohepta[3,4,5-de]-isoquinoline N-oxide;

b. reacting the last-named compound with a haloolefin of formula



in which X is chloro, bromo or iodo to obtain the corresponding quaternary salt of formula 4

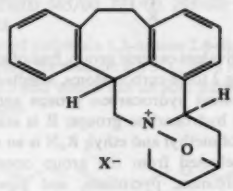


in which X is the same as the halogen of the haloolefin employed;

c. reducing the compound of formula 4 in which X is chloro, bromo or iodo with a complex metal hydride reducing agent to obtain (4a,13b-trans)-2,3,4,4a,8,9,13b,14-octahydro-1H-benzo[6,7]isoquinolin-3-ol; and

d. oxidizing the last-named compound with a reagent for converting a hydroxy function to the corresponding keto function to obtain (4a,13b-trans)-1,2,4,4a,8,9,13b,14-octahydro-3H-benzo[6,7]cyclohepta[1,2,3-de]pyrido[2,1-a]isoquinolin-3-one.

8. A compound of the formula



in which X is chloro, bromo or iodo.

4,059,586

5-ALKOXY-2-ALKYL-1,2,3,4-TETRAHYDROISOQUINOLENE-8-CARBOXALDEHYDE AND DERIVATIVES

Ian William Mathison; William Ebenezer Solomons, both of Memphis, Tenn., and Raymond Henry Jones, Northport, N.Y., assignors to Marion Laboratories, Inc., Kansas City, Mo.

Division of Ser. No. 455,600, March 28, 1974, Pat. No. 3,978,067. This application May 24, 1976, Ser. No. 689,078

Int. Cl.² C07D *217/24*

U.S. Cl. 260—287 D **6 Claims**

1. 5-Lower alkoxy-2-lower alkyl-1,2,3,4-tetrahydroisoquinoline-8-carboxaldehyde.

3. Beta-(5-lower alkoxy-2-lower alkyl-1,2,3,4-tetrahydroisoquinoline-8)propenoic acid.

5. Beta-(5-lower alkoxy-2-lower alkyl-1,2,3,4-tetrahydroisoquinoline-8)propanoic acid.

4,059,587

CERTAIN THIAZOLIDINE COMPOUNDS

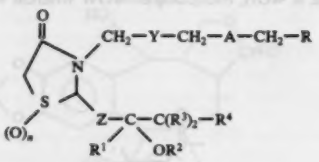
Robert L. Smith, Lansdale; Ta-Jyh Lee, Hatfield, and Edward J. Cragoe, Jr., Lansdale, all of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed May 24, 1976, Ser. No. 689,311

Int. Cl.² C07D *277/14*

U.S. Cl. 260—301 **36 Claims**

1. The compound of the formula



wherein

R is carboxy, a carboxy salt having the formula —COO⁻M⁺ from a metal or an amine, or derivatized carboxy in which R is selected from alkoxycarbonyl (—COOR⁵ wherein R⁵ is alkyl having 1–10 carbon atoms), carbamoyl (—CO_2NH_2), substituted carbamoyl (—CONR⁶R⁷) wherein R⁶ and R⁷ are selected from the group consisting of hydrogen, lower alkyl having 1–4 carbon atoms, and diloweralkylaminoalkyl having 4–7 carbon atoms, and carbazoyl (—$CONHNH_2$);

A is selected from the group consisting of methylene and oxygen;

Y is selected from the group consisting of ethylene, vinylene, and ethynylene;

n is 0, 1, or 2;

Z is selected from the group consisting of ethylene and vinylene;

R¹ is hydrogen or methyl;

R² is hydrogen or lower alkanoyl of from 1–5 carbon atoms;

R³ is hydrogen or methyl; and

R⁴ is alkyl or branched chain alkyl of from 3–6 carbon atoms, 4,4,4-trifluorobutyl, or when R⁴ is lower straight chain alkyl and R¹ is methyl, the terminal carbon atom of R⁴ can be joined to R¹ to form a polymethylene chain of from 4–7 carbon atoms, or when R⁴ is straight chain alkyl and R¹ is hydrogen, the terminal carbon atom of R⁴ can be joined to the carbon atom bearing OR² to form a polymethylene chain of from 3–6 carbon atoms.

4,059,588

PROCESS FOR PREPARING 6-PHENYL-2,3,5,6-TETRAHYDROIMIDAZO [2,1-b]THIAZOLE

Asbjorn Baklien, Kingsbury, and Jan Kolm, Kew, both of Australia, assignors to ICI Australia Limited, Melbourne, Australia

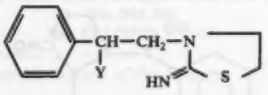
Division of Ser. No. 565,092, July 14, 1966, Pat. No. 3,759,937. This application Apr. 3, 1972, Ser. No. 240,826

Claims priority, application Australia, July 19, 1965, 61653/65; July 26, 1965, 61931/65; Aug. 31, 1965, 63415/65; Sept. 8, 1965, 63786/65

Int. Cl.² C07D *513/04*

U.S. Cl. 260—306.7 T **3 Claims**

1. A process which comprises contacting an acid addition salt of a compound of the formula:



wherein Y is halogen, with an aqueous alkaline solution, heating the mixture at a temperature in the range between 40° and 150° C. to cause the formation of the free base of the dl 6-phenyl-2,3,5,6-tetrahydroimidazo[2,1-b]thiazole, as a separate phase separating the separate phase and recovering said product therefrom.

4,059,589

PROCESS FOR FORMYLATION

Paul Scherberich, Dietzenbach, and Wolf-Dieter Pfeifer, Grossauheim, both of Germany, assignors to Deutsche Gold- und Silber-Schneideanstalt vormals Roessler, Frankfurt, Germany

Filed July 12, 1974, Ser. No. 488,233

Claims priority, application Germany, July 14, 1973, 2335990

Int. Cl.² C07D *277/06, 277/46, 245/16*

U.S. Cl. 260—306.7 C **18 Claims**

1. In a process for the formylation of an organic basic nitrogen compound having at least a hydrogen atom attached to the basic nitrogen atom in the presence of acetic anhydride, the improvement comprising adding the nitrogen compound as a salt with an acid and carrying out the formylation without formic acid and with an alkali formate or ammonium formate in an inert organic solvent having limited solubility in water.

4,059,590

CERTAIN 4-HALO-5-ARYL-1,2,3-DITHIAZOLE COMPOUNDS AND THEIR PREPARATION

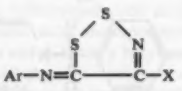
Joseph E. Moore, Richmond, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed June 21, 1976, Ser. No. 698,383

Int. Cl.² C07D *285/00*

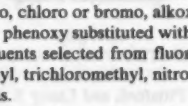
U.S. Cl. 260—306.8 R **9 Claims**

1. A compound of the formula



wherein X is fluoro, chloro, bromo, iodo and Ar is phenyl, naphthyl or phenyl or naphthyl substituted with 1 to 3 of the same or different substituents selected from hydroxy, fluoro, chloro, bromo, iodo, cyano, nitro, benzoyl, formyl, alkanoyl of 2 to 6 carbon atoms, alkyl of 1 to 6 carbon atoms, haloalkyl of 1 to 2 carbon atoms and 1 to 5 of the same or different halogens selected from fluoro, chloro or bromo, alkoxy of 1 to 4 carbon atoms, phenoxy, or phenoxy substituted with 1 to 2 of the same of different substituents selected from fluoro, chloro, bromo, iodo, trifluoromethyl, trichloromethyl, nitro, cyano or alkyl of 1 to 4 carbon atoms.

6. A process for preparing a compound of the formula



wherein Ar and X are as defined in claim 1 which comprises reacting substantially equimolar amounts of a sulfur dihalide wherein the halide is chloro or bromo and a N-aryl cyanothioformamide of the formula

wherein Ar is as defined above, in the liquid phase at a temperature of 0° to 100° C in the presence of a catalytic amount of an N,N-dialkylformamide or an N-alkylformamide wherein the alkyl groups have 1 to 4 carbon atoms, or a quaternary ammonium salt.

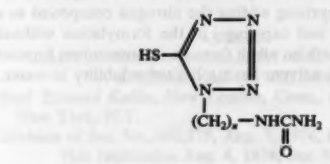
4,059,591

UREIDOALKYL SUBSTITUTED TETRAZOLE THIOL INTERMEDIATES FOR PREPARING CEPHALOSPORINS

David A. Berges, Wayne, Pa., assignor to SmithKline Corporation, Philadelphia, Pa.

Division of Ser. No. 639,033, Dec. 9, 1975, Pat. No. 4,025,626.
This application Dec. 22, 1976, Ser. No. 753,410
Int. Cl.[2] C07D *257/04*
U.S. Cl. 260—308 D 2 Claims

1. A compound of the formula



in which *n* is two to five.

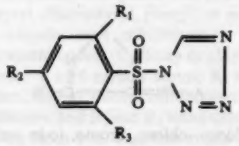
4,059,592

ARYLSULFONYL TETRAZOLES

Saran A. Narang, and Jacek Stawinski, both of Ottawa, Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Filed Feb. 10, 1976, Ser. No. 656,858
Int. Cl.[2] C07D *257/04*
U.S. Cl. 260—308 D 6 Claims

1. An arylsulfonyl tetrazole of the formula



where R_1, R_2 and R_3 are selected from hydrogen, lower alkyl and lower alkoxy groups, the alkyl and alkoxy groups having from 1 to 4 carbon atoms.

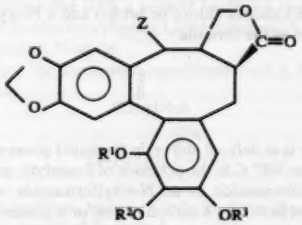
4,059,593

SYNTHESIS OF STEGANACIN AND DERIVATIVES THEREOF

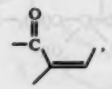
Andrew S. Kende, Pittsford, and Lanny S. Liebeskind, Snyder, both of N.Y., assignors to University of Rochester, Rochester, N.Y.

Division of Ser. No. 642,954, Dec. 22, 1975, Pat. No. 4,003,916.
This application Aug. 18, 1976, Ser. No. 715,487
Int. Cl.[2] C07D *317/44*
U.S. Cl. 260—340.5 R 2 Claims

1. A process for the preparation of a racemic mixture of the compound having the formula

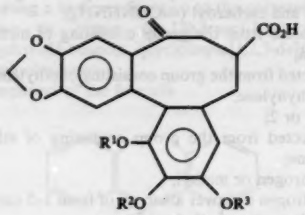


in which Z is ◄OH, oxo (=O) or ◄OW wherein W is acetyl or



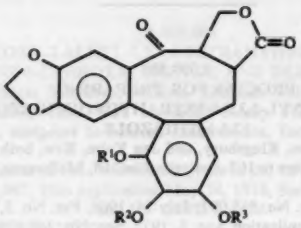
and R^1, R^2 and R^3 are alike or different and each is H or (lower-)alkyl of 1 to 3 carbon atoms, which process comprises the consecutive steps of

A. treating the compound having the formula



in which R^1, R^2 and R^3 are as defined above, with excess 37% aqueous formaldehdye in the presence of 0.1–2.0M alkali metal hydroxide for about 1 to 48 hours, followed by heating in the presence of excess dilute sulfuric acid and chloroform to produce the compound having the formula

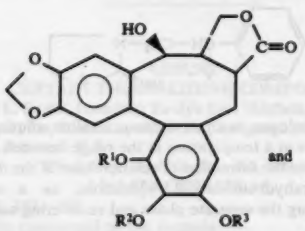
IV



in which R^1, R^2 and R^3 are as defined above;

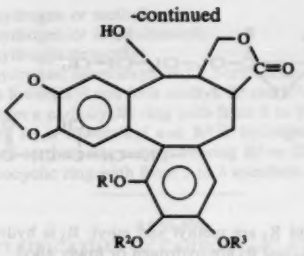
B. treating compound IV with sodium borohydride in methylene chloride-anhydrous methanol to produce a mixture of the compounds having the formula

III



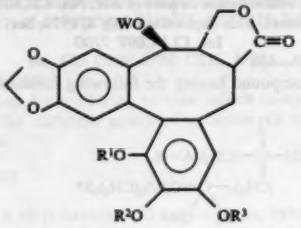
and

-continued

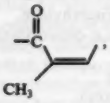


in which R^1, R^2 and R^3 are as defined above, which mixture is separated into its component parts;

C. acylating compound III with acetic anhydride, acetyl halide or angelic acid halide in the presence of a tertiary amine to produce the compound having the formula



in which W is acetyl or



R^1, R^2 and R^3 are as defined above and halide is Cl, Br or I.

4,059,594

STEREOSPECIFIC PROCESS FOR PRODUCTION OF C-5-ARALKOXY-R-2-SUBSTITUTED-5-ALKYL-1,3-DIOXANES AND INTERMEDIATES

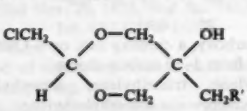
Marvin Joseph Konz, Lockport, N.Y., assignor to FMC Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 404,807, Oct. 9, 1973, abandoned, which is a continuation-in-part of Ser. No. 187,971, Oct. 12, 1971, abandoned. This application Jan. 16, 1975, Ser. No. 541,386

Int. Cl.² C07D *319/04*

U.S. Cl. 260—340.7 **4 Claims**

1. A hydroxy-1,3-dioxane of the formula:



in which R′ is hydrogen or lower alkyl.

4,059,595

V PROCESS FOR PREPARING 3-OXY-4H-PYRAN-4-ONE DERIVATIVES

Tatsuya Shono, Kyoto, and Yoshihiro Matsumura, Takatsuki, both of Japan, assignors to Otsuka Kagaku Yakuhin Kabushiki Kaishi, Osaka, Japan

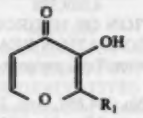
Filed Feb. 26, 1976, Ser. No. 661,823

Claims priority, application Japan, July 17, 1975, 50-87940

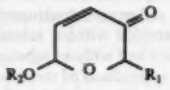
Int. Cl.² C07D *309/22*

U.S. Cl. 260—345.9 R **10 Claims**

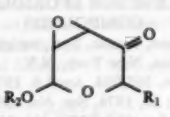
1. A process for preparing a 3-oxy-4H-pyran-4-one derivative represented by the formula:



wherein R_1 is hydrogen or straight-chain or branched-chain alkyl having 1 to 10 carbon atoms which comprises the steps of: (1) epoxidizing a 3-oxo-3,6-dihydro-2H-pyran derivative represented by the formula:



wherein R_1 is as defined above and R_2 is hydrogen, straight-chain or branched-chain alkyl having 1 to 6 carbon atoms or straight-chain or branched-chain acyl having 1 to 6 carbon atoms with a peroxide selected from the group consisting of hydrogen peroxide, trifluoroperacetic acid, perbenzoic acid, monochloroperbenzoic acid, monoperphthalic acid, tertiary butylhydroperoxide and di-tertiary butyl peroxide, in the presence of an alkaline substance at a temperature of about −30 to 40° C to obtain a 4,5-epoxy-3-oxotetrahydropyran derivative represented by the formula



wherein R_1 and R_2 are as defined above, and (2) heating the 4,5-epoxy-3-oxotetrahydropyran derivative in the presence of an acid catalyst.

4,059,596

2,5-BIS(BENZYLOXY)TETRAHYDROFURAN

Heinz Eggensperger; Wolfgang Beilfuss, and Helmut Hermann Ehlers, all of Hamburg, Germany, assignors to Sterling Drug Inc., New York, N.Y.

Division of Ser. No. 593,558, July 7, 1975, Pat. No. 4,004,024. This application July 15, 1976, Ser. No. 705,685

Claims priority, application Germany, July 15, 1974, 2433836

Int. Cl.² C07D *307/20*

U.S. Cl. 260—347.8 **1 Claim**

1. 2,5-Bis(benzyloxy)tetrahydrofuran.

4,059,597

1-[5-(2-NITROPHENYL)-2-FURANCARBOXIMIDOYL]-1H-HEXAHYDROAZEPINE HYDROCHLORIDE

Stanford S. Pelosi; Ronald E. White; George C. Wright, and Chia Nien Yu, all of Norwich, N.Y., assignors to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed Jan. 28, 1977, Ser. No. 763,328
Int. Cl.[2] C07D *307/66*
U.S. Cl. 260—347.7 **1 Claim**

1. The compound 1-[5-(2-nitrophenyl)-2-furancarboximidoyl]-1H-hexahydroazepine hydrochloride.

4,059,598

DECOMPOSITION OF HYDROPEROXIDES IN PROPYLENE EPOXIDATION REACTION PRODUCT

James J. Coyle, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Continuation of Ser. No. 384,857, Aug. 2, 1973, abandoned, and a continuation-in-part of Ser. No. 102,971, Dec. 30, 1970, abandoned. This application Aug. 13, 1973, Ser. No. 387,849
Int. Cl.[2] C07D *301/20, 301/32*
U.S. Cl. 260—348.16 **6 Claims**

1. A process for treating the reaction product of a process in which propylene is converted to propylene oxide by reaction with an organic hydroperoxide, said reaction product comprising propylene oxide and organic hydroperoxide, to decompose the organic hydroperoxide without substantial decomposition of the propylene oxide and without substantial formation of C_5 to C_7 hydrocarbons as products of the decomposition reaction, which comprises contacting a catalyst-free reaction mixture recovered as effluent from said epoxidation process, at a temperature in the range from about 0° to about 200° C and a pressure sufficient to maintain the reaction mixture in liquid phase with a non-acidic heterogeneous catalyst system consisting essentially of an oxide of cobalt on a solid support and from 0 to 100 percent by weight of copper oxide based on said cobalt oxide, and recovering a propylene oxide product essentially free of said organic hydroperoxide.

4,059,599

BORIDE CATALYST FOR EPOXIDIZING OLEFINIC COMPOUNDS

Robert Malone Gipson, Austin, Tex., assignor to Texaco Development Corporation, New York, N.Y.

Division of Ser. No. 565,004, April 4, 1975. This application June 25, 1976, Ser. No. 699,835
Int. Cl.[2] C07D *301/20*
U.S. Cl. 260—348.29 **2 Claims**

1. A method for the liquid phase epoxidation of an olefin having from about 2 to about 60 carbon atoms with an organic hydroperoxide comprising the step of:

intimately contacting said olefin with said organic hydroperoxide at lower temperatures of about 25° C to about 200° C and pressures sufficient to maintain the product and reactants substantially in liquid phase in the presence of a catalytically effective amount of a binary boride consisting of boron and cerium.

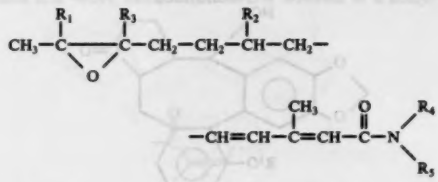
4,059,600

EPOXY DODECADIENAMIDES

Madhukar Subraya Chodnekar, Basel; Albert Pfiffner, Pfaffhausen; Norbert Rigassi, Arlesheim; Ulrich Schwieter, Reinach, and Milos Suchy, Pfaffhausen, all of Switzerland, assignors to Hoffmann-La Roche, Inc., Nutley, N.J.

Filed Jan. 7, 1972, Ser. No. 216,256
Claims priority, application Switzerland, Jan. 20, 1971, 849/71; South Africa, Dec. 15, 1971, 71/8418; New Zealand, Dec. 15, 1971, 165805
Int. Cl.[2] C07D *303/46, 303/40, 303/28*; A01N *9/28*
U.S. Cl. 260—348.46 **3 Claims**

1. A compound of the formula:



wherein R_1 and R_2 are methyl and ethyl; R_3 is hydrogen or methyl; and R_4 and R_5 are hydrogen or lower alkyl.

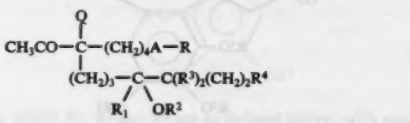
4,059,601

8-HALO-11,12-SECOPROSTAGLANDINS

Edward J. Cragoe, Jr., and John B. Bicking, both of Lansdale, Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 584,555, June 6, 1975, Pat. No. 3,991,087, which is a continuation-in-part of Ser. No. 424,501, Dec. 13, 1973, abandoned. This application July 8, 1976, Ser. No. 703,323
Int. Cl.[2] C09F *7/00*
U.S. Cl. 260—408 **12 Claims**

1. The compound having the following formula:



wherein R is carboxy, a carboxy salt, or —COOY wherein Y is alkyl having from 1–10 carbon atoms;

A is ethylene, trimethylene, α-methylethylene, β-methylethylene, α,α-dimethylethylene, or β,β-dimethylethylene;

Q is chloro or bromo;

R^1 is hydrogen or methyl;

R^2 is hydrogen or loweralkanoyl;

R^3 is hydrogen or methyl;

R^4 is 2,2,2-trifluoroethyl; or, when R^4 is loweralkyl and R^1 is methyl, R^4 and R^1 are joined to form a carbocyclic ring with from 6 to 9 members; or when R^4 is loweralkyl and R^1 is hydrogen, R^4 can be joined to the carbon atom bearing R^1 or OR^2 to form a carbocyclic ring with from 5 to 8 members.

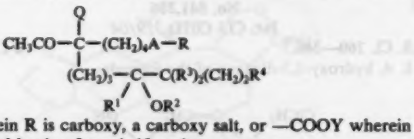
4,059,602

8-METHYL-, PHENYL-, OR SUBSTITUTED PHENYL-11,12-SECOPROSTAGLANDINS

Edward J. Cragoe, Jr., and John B. Bicking, both of Lansdale, Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 584,555, June 6, 1975, Pat. No. 3,991,087, and a continuation-in-part of Ser. No. 424,501, Dec. 13, 1973, abandoned. This application July 8, 1976, Ser. No. 703,330
Int. Cl.[2] C09F *7/00*; C11C *3/00*
U.S. Cl. 260—408 **22 Claims**

1. The compound having the following formula:



wherein R is carboxy, a carboxy salt, or —COOY wherein Y is alkyl having from 1–10 carbon atoms;

A is ethylene, trimethylene, α-methylethylene, β-methylethylene, α,α-dimethylethylene, or α,α-dimethylethylene;

Q is methyl, phenyl, or substituted phenyl;

R^1 is hydrogen or methyl;
R^2 is hydrogen or loweralkanoyl;
R^3 is hydrogen or methyl;
R^4 is hydrogen, loweralkyl, or 2,2,2-trifluoroethyl; or, when R^4 is loweralkyl and R^1 is methyl, R^4 and R^1 can be joined to form a carbocyclic ring with from 6 to 9 members; or when R^4 is loweralkyl and R^1 is hydrogen, R^4 can be joined to the carbon atom bearing R^1 or OR^2 to form a carbocyclic ring with from 5 to 8 members.

4,059,603

ESTERIFICATION OF CARBOXYLIC ACIDS BY CONTACT WITH A PHOSPHONIUM SALT

Noboru Yamazaki, and Fukuji Higashi, both of Tokyo, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Division of Ser. No. 475,877, June 3, 1974, Pat. No. 3,974,219, and a continuation-in-part of Ser. No. 305,256, Nov. 10, 1972, abandoned. This application May 20, 1976, Ser. No. 688,289
Claims priority, application Japan, Nov. 12, 1971, 46-90767; Nov. 12, 1971, 46-90768; Nov. 22, 1971, 46-93872; Feb. 19, 1972, 47-17355
Int. Cl.² C09F 5/08; C11C 3/02
U.S. Cl. 260—408 8 Claims

1. A process for producing an ester which comprises
reacting the carboxyl group of a carboxylic acid of the formula,

$$R^1COOH \qquad (I)$$

wherein R^1 is alkyl having 1–30 carbon atoms, halogen substituted alkyl having 1–10 carbon atoms, cycloalkyl having 3–8 carbon atoms, phenyl, alkyl having 1–4 carbon atoms substituted phenyl or phenylalkyl having 7–12 carbon atoms, with a phosphonium salt obtained by reacting a phosphorous ester selected from the group consisting of monomethyl, monoethyl, monoisopropyl, monophenyl, dimethyl, diethyl, diisopropyl, di-n-butyl, diphenyl, triethyl, triisopropyl and tributyl esters of phosphorous acid, or an ammonium salt of the phosphorous monoester, with an organic base selected from the group consisting of pyridine, 2-methylpyridine, 3-methylpyridine, 4-methylpyridine, 2,6-dimethylpyridine or triethylamine, and an oxidizing agent selected from the group consisting of bromine, iodine, mercurous chloride, mercuric chloride, mercuric bromide or mercuric acetate, at a temperature of from 30° to 200° C, and then reacting the resulting carboxylic acid with a hydroxyl group-containing compound of the formula,

$$R^4OH \qquad (III\text{-}a)$$

wherein R^4 is alkyl having 1–18 carbon atoms, cycloalkyl having 3–8 carbon atoms, phenyl, naphthyl, aryl having at least one substitutent selected from the group consisting of alkyl having 1–4 carbon atoms, nitro, cyano, N,N-dimethylamino and methoxycarbonyl, or phenylalkyl having 7–12 carbon atoms, at a temperature of from 0° to 200° C.

3. A process according to claim 1, wherein the carboxylic acid has C_{1-18} alkyl, halogen substituted C_{1-6} alkyl, cyclo-C_{3-6} alkyl phenyl, C_{1-4} alkyl substituted phenyl or phenyl-C_{1-6} alkyl as R^1.

4,059,604

SEPARATION OF MATURE OKRA SEED INTO COMPONENT FRACTIONS

Herman J. Kresse, 7602 Marinette, Houston, Tex. 77074

Filed Nov. 29, 1976, Ser. No. 745,936
Int. Cl.² C11B 1/10
U.S. Cl. 260—412.4 2 Claims

1. A method of separating mature okra seeds into various components comprising,
mixing broken up mature okra seeds with a liquid medium of a mixture of trichlorotrifluorethane and hexane adjusted to a specific gravity of 1.3 plus or minus 0.2 at 60° F. whereby the liquid medium extracts the oil from the broken up okra seed,
ceasing the mixing of the broken up seed with the liquid to allow the seed components to separate due to their differences in density whereby the hulls sink to the bottom of the liquid, the germ floats on top of the liquid, and the kernel floats or remains in suspension in the liquid,
decanting the solution of liquid and germ and kernel material from the hulls,
filtering the liquid from the germ and kernel components, and
separating the oil from the liquid medium.

4,059,605

NON-ISOMERIZABLE OLEFINIC POLYOXYALKYLENE POLYMERS AND SILOXANE-POLYOXYALKYLENE COPOLYMER DERIVATIVES THEREOF

Everett W. Bennett, Longmeadow, Mass., assignor to Union Carbide Corporation, New York, N.Y.

Continuation of Ser. No. 129,562, March 30, 1971, Pat. No. 3,957,843. This application Feb. 20, 1976, Ser. No. 659,973
Int. Cl.² C07F 7/08
U.S. Cl. 260—448.2 B 1 Claim

1. A siloxane-polyoxyalkylene block copolymer consisting essentially of:
a. at least one unit having the formula:

$$O_{\frac{4-(m+n)}{2}}\!-\!Si(Y)_m\left[\begin{array}{c} H \\ | \\ CH_2C\!-\!X\!-\!(OR'')_bOR''' \\ | \\ R \end{array}\right]_n$$

wherein X is a cyclic divalent hydrocarbon group free of aliphatic carbon to carbon multiple bonds, Y is a monovalent hydrocarbon group free of aliphatic carbon to carbon multiple bonds, R is hydrogen or a monovalent hydrocarbon group free of aliphatic carbon to carbon multiple bonds, R'' is an alkylene group containing at least two carbon atoms, R''' is R, —OCNHR, —OCR′, or OCOR′ where R′ is a monovalent hydrocarbon group free of aliphatic carbon to carbon multiple bonds, m has a value from 0 to 2 inclusive, n has a value from 1 to 3 inclusive, $(m+n)$ has a value from 1 to 3 inclusive, and b has a value of at least 5; and
b. units having the formula:

$$Z_pSiO_{\frac{4-p}{2}}$$

wherein p has a value from 1 to 3 inclusive and Z is a monovalent hydrocarbon group free of aliphatic carbon to carbon multiple bonds.

4,059,606

ORGANOSILICON COMPOUNDS

Richard Warren Walsingham, and Ronald Sangster Stuart, both of Manchester, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Aug. 11, 1976, Ser. No. 713,503
Claims priority, application United Kingdom, Aug. 29, 1975, 35706/75
Int. Cl.² C07F 7/08
U.S. Cl. 260—448.2 B 9 Claims

1. A polysiloxane of the formula:

$$(CH_3)_3Si\,.\,O\,.\,[Si(CH_3)_2O]_d[Si(CH_3)O]_eSi(CH_3)_3$$
$$\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\quad |$$
$$\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad (CH_2)_3OCH_2CH\,.\,(OC_2H_4)_gOR^{10}$$
$$\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\quad |$$
$$\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad CH_2OR^1$$

wherein

R^1 is lower alkyl, lower alkoxylower alkyl or cyclohexyl group,
R^{10} is H, acetyl or trimethylsilyl,
n is 2, 3 or 4, all units C_nH_{2n} not necessarily being alike,
x has a value from 2 to 100
s has a value from 0 to about 50 and
t has a value from 1 to about 20.

4,059,607

PREPARATION OF HYDROCARBON CHLOROSILANES FROM POLYSILANES

James Dale Reedy, New Fairfield, Conn., and Thomas Harold Barker, Newport, Ohio, assignors to Union Carbide Corporation, New York, N.Y.

Filed Dec. 20, 1976, Ser. No. 752,811
Int. Cl.² C07F 7/12
U.S. Cl. 260—448.2 E **14 Claims**

1. A process of reacting

$$RCl \quad (1)$$

with a polysilane consisting of units of the formula:

$$Me_xCl_ySi \quad (2)$$

to produce RMe_xSiCl_{3-x}, which comprises carrying out the reaction in contact with a combined catalytic amount of co-catalyst (a) and co-catalyst (b), wherein co-catalyst (a) is selected from the group consisting of R'_3N, R'_3NHCl, R'_4NCl and R'_4PCl, and co-catalyst (b) is selected from the group consisting of metal salts and metal complexes, at a temperature of from about 10° C to about 60° C, wherein
R is an alkyl radical of from 1 to 18 carbon atoms, an alkenyl radical of from 2 to 18 carbon atoms, or an aralkyl radical of from 7 to 18 carbon atoms,
x is 0 to 2,
y is 0 to 3,
the sum of x and y being from 2 to 3 with the proviso that at least one silicon atom of the polysilane be bonded to at least one chlorine group; all the silicon atoms in (2) being bonded to at least one other silicon atom and all the valences of the silicon atoms in (2) being satisfied by other silicon atoms, Cl or Me radicals, and R' is one or more of an alkyl or aralkyl radical of from 1 to 18 carbon atoms.

4,059,608

PROCESS FOR THE PREPARATION OF HYDROGENOSILANES

Raymond Calas, Le Bouscat; Jacques Dunogués; Gérard Déléris, both of Talence; Marcel Lefort, Caluire et Cuire, and Christian Simonnet, Venissieux, all of France, assignors to Rhone-Poulenc Industries, Paris, France

Filed Mar. 4, 1977, Ser. No. 774,486
Claims priority, application France, Mar. 5, 1976, 76.07042
Int. Cl.² C07F 7/08, 7/12, 7/18
U.S. Cl. 260—448.2 E **10 Claims**

1. A process for preparing hydrogenosilanes, which comprises the step of contacting at least one disilane of the formula $(R)_3Si—Si(R)_3$, wherein the substituents R are the same or different from each other and represent an alkyl group containing 1 to 6 carbon atoms, an alkoxy group containing 1 to 6 carbon atoms, phenyl, halogen, hydrogen, 3,3,3-trifluoropropyl or trimethylsiloxy, with gaseous hydrogen under pressure in the presence of a catalytic system consisting essentially of:
a. 0.2 to 10% by weight, relative to the weight of the disilane, of an aprotic base, and
b. 0.05 to 5%, as the weight of elemental metal relative to the weight of the disilane, of a nickel catalyst which consists essentially of finely divided nickel, and is obtained by reduction of a nickel compound.

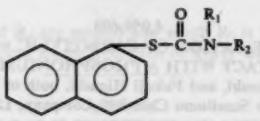
4,059,609

S-NAPHTHYL N-ALKYLTHIOLCARBAMATES

Jay Kent Rinehart, Akron, Ohio, assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed June 4, 1976, Ser. No. 693,044
Int. Cl.² C07C 155/02
U.S. Cl. 260—455 A **12 Claims**

1. A S-α-naphthyl N-alkylthiolcarbamate of the general formula:



wherein:
R_1 is hydrogen, or an alkyl of one to five carbon atoms, and
R_2 is an alkyl of one to five carbon atoms.

4,059,610

PROCESS FOR PREPARING ISOCYANIC ACID DERIVATIVES

Susumu Handa, Wakayama; Yoshiaki Tanaka, Osaka; Atsushi Nishibata, Wakayama; Sadashi Ueda, Wakayama; Yoshiaki Inamoto, Wakayama; Masahiro Saito, Wakayama; Fumio Tanimoto, Kyoto, and Hisao Kitano, Osaka, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed May 14, 1976, Ser. No. 686,381
Claims priority, application Japan, May 21, 1975, 50-60601
Int. Cl.² C07C 118/00
U.S. Cl. 544—193 **10 Claims**

1. A process for preparing isocyanic acid derivative having a isocyanatomethyl group and/or isocyanurate ring structure, which consists essentially of reacting at 70° to 200° C (A) an organic halogen compound having a monohalogenomethyl group or monohalogenomethylene group, or mixtures thereof, with (B) an alkali cyanate selected from the group consisting of lithium cyanate, sodium cyanate, potassium cyanate, rubidium cyanate, cesium cyanate, ammonium cyanate and mixtures thereof, in (C) an organic solvent selected from the group consisting of N,N-disubstituted organic acid amines, N,N'-disubstituted organic sulfonic acid amides, dialkyl sulfoxides, dialkyl sulfones, polyalkylene sulfoxide, polyalkylene sulfone, macrocyclic polyethers and mixtures thereof, in the presence of (D) at least one polyhalogen compound selected from the group consisting of compounds having dihalogenomethyl group, dihalogenomethylene group or trihalogenomethyl group and tetrahalogenomethanes in an amount in the range of from 1 to 20 weight percent, based on the weight of said organic halogen compound (A), until isocyanic acid derivative of (A) is formed, said polyhalogen compound (D) being compatible with organic compounds or organic halogen compounds as reaction solvent and being present at the start or midway of the reaction and being effective to prevent side reactions and being unchanged by the reaction, and recovering from the reaction mixture said isocyanic acid derivative.

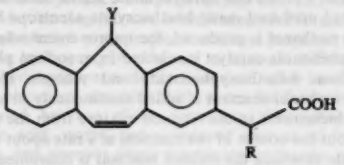
4,059,611

OXIDATIVE PROCESS FOR THE PREPARATION OF 2-(5H-DIBENZO[a,d]CYCLOHEPTEN-5-ON-2-yl)A-CETIC, PROPIONIC AND BUTYRIC ACID

Peter H. Nelson, and Karl G. Untch, both of Los Altos, Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Division of Ser. No. 611,050, Sept. 8, 1975, abandoned. This application July 6, 1976, Ser. No. 702,651
Int. Cl.² C07C 143/68, 65/14, 83/00
U.S. Cl. 260—456 P **3 Claims**

1. A compound represented by the formula



wherein R is hydrogen, methyl or ethyl and Y is hydroxy or a sulfonate moiety selected from the group consisting of methanesulfonyloxy, benzenesulfonyloxy, p-toluenesulfonyloxy, p-bromobenzenesulfonyloxy, p-nitrobenzenesulfonyloxy and naphthylsulfonyloxy; the esters thereof formed from straight or branched chain alkanols having from 1 to 20 carbon atoms or from benzyl alcohol; and the salts thereof selected from the group consisting of sodium, potassium, lithium, calcium, magnesium, ammonium, copper, ethanolamine, diethylamine, tris(-hydroxymethyl)aminomethane, choline, caffeine and lysine salts.

4,059,612
SUBSTITUTED INDANONES

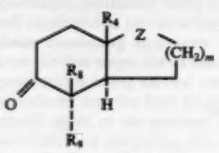
Zoltan George Hajos, Upper Montclair, N.J., assignor to Hoffmann-La Roche, Inc., Nutley, N.J.

Division of Ser. No. 482,711, June 24, 1974, Pat. No. 3,984,473, which is a division of Ser. No. 765,023, Oct. 4, 1968, Pat. No. 3,897,460. This application July 14, 1976, Ser. No. 705,365

Int. Cl.² C07C *143/68*

U.S. Cl. 260—456 R **1 Claim**

1. A compound of the formula



wherein Z is $CH(OR_2)$; R_2 is hydrogen, lower alkyl, lower alkoxy-lower alkyl, phenyl-lower alkyl, lower alkanoyl, or trifluoroacetyl; R_4 is hydrogen or lower alkyl; *m* is an integer having the value of 1 or 2; R_5 is hydrogen and R_9 is methylene-X, where X is lower-alkylarylsulfonyloxy, arylsulfonyloxy or lower alkylsulfonyloxy,

its optical enantiomer and the racemate thereof.

4,059,613
FLUORINE-CONTAINING DICARBAMATE ESTERS

Yasusi Nakamura; Masashi Umemura, and Michimasa Yonekura, all of Tokyo, Japan, assignors to Asahi Denka Kogyo K.K., Tokyo, Japan

Division of Ser. No. 511,272, Oct. 2, 1974, Pat. No. 3,952,075. This application Jan. 6, 1976, Ser. No. 646,921

Claims priority, application Japan, Oct. 3, 1973, 48-111225; Oct. 3, 1973, 48-111226; Oct. 3, 1973, 48-111227; Oct. 3, 1973, 48-111229; Nov. 24, 1973, 48-132040; Nov. 24, 1973, 48-132041; Nov. 24, 1973, 48-132042; Nov. 24, 1973, 48-132043; Nov. 24, 1973, 48-132044; Nov. 24, 1973, 48-132045; Dec. 28, 1973, 49-113; Dec. 28, 1973, 49-114; Dec. 28, 1973, 49-115; Dec. 28, 1973, 49-116; Dec. 28, 1973, 49-118; Dec. 28, 1973, 49-119; Aug. 10, 1974, 49-65763; Aug. 10, 1974, 49-65764; Aug. 10, 1974, 49-65768; Aug. 10, 1974, 49-65769; Aug. 10, 1974, 49-65770; Aug. 10, 1974, 49-65771

Int. Cl.² C07C *125/06*

U.S. Cl. 560—26 **10 Claims**

1. A compound having the formula

$$R_f(CH_2)_pO(RO)_nCONHR'NHCOO(C_2H_4O)_nH$$

wherein R_f is perfluoroalkyl having 4 to 14 carbon atoms, *p* is a number of from one to 10 and $R_f(CH_2)_p$- has from 6 to 16 carbon atoms; R is alkylene having from 2 to 4 carbon atoms; R' is alkylene, arylene or alkarylene having from 2 to 8 carbon atoms; *m* is a number of from one to 50; and *n* is a number of from one to 50.

4,059,614
2,2-DIFLUORO-16-PHENOXY-PGE$_1$ ANALOGS

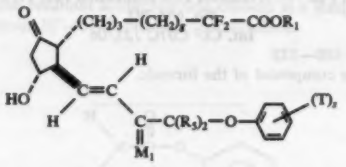
Udo F. Axen, Plainwell, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 552,708, Feb. 25, 1975, Pat. No. 4,001,300. This application Sept. 17, 1976, Ser. No. 724,240

Int. Cl.² C07C *65/22*

U.S. Cl. 560—53 **58 Claims**

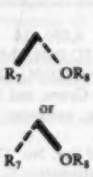
1. A compound of the formula



or a mixture comprising that compound and the enantiomer thereof,

wherein *g* is 2 to 4, inclusive;

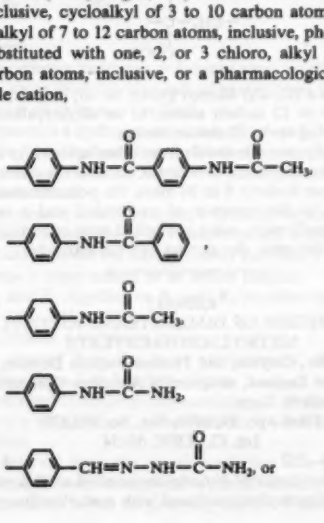
wherein M_1 is



wherein R_7 and R_8 are hydrogen or methyl, with the proviso that one of R_7 or R_8 is methyl only when the other is hydrogen;

wherein T is alkyl of one to 3 carbon atoms, inclusive, fluoro, chloro, trifluoromethyl, or —OR_4 wherein R_4 is alkyl of one to 3 carbon atoms, inclusive, and wherein *s* is zero, one, 2, or 3, with the proviso that not more than two T's are other than alkyl;

wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, 2, or 3 chloro, alkyl of one to 4 carbon atoms, inclusive, or a pharmacologically acceptable cation,



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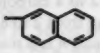


; and

wherein R_5 is hydrogen or methyl, with the proviso that R_5 is methyl only when R_7 and R_8 are both hydrogen.

4,059,615

SIDE CHAIN HALOGENATED ALKYLPHENYL HALOFORMATES AND DERIVATIVES

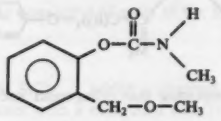
Edward D. Weil, Hastings-on-Hudson, N.Y., assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Continuation of Ser. No. 19,516, March 13, 1970, abandoned, which is a continuation-in-part of Ser. No. 816,426, Nov. 7, 1968, Pat. No. 3,651,129, which is a division of Ser. No. 305,509, Aug. 29, 1963, Pat. No. 3,420,868. This application Feb. 17, 1976, Ser. No. 658,792

Int. Cl.² C07C *125/06*

U.S. Cl. 560—132 **1 Claim**

1. The compound of the formula



4,059,616

NOVEL METHACRYLIC POLYMERS HAVING ALLYL FUNCTIONALITY

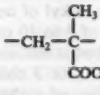
Sheldon N. Lewis, Willow Grove, and Richard A. Haggard, Fort Washington, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 371,921, June 20, 1973, abandoned, which is a continuation-in-part of Ser. No. 137,057, April 23, 1971, abandoned. This application Oct. 23, 1974, Ser. No. 517,334

Int. Cl.² C07G *69/54*

U.S. Cl. 526—66 **8 Claims**

1. An alkoxide-polymerized addition homopolymer or copolymer of an ester of methacrylic acid wherein the polymer comprises mers having the formula



wherein R is a (C_2–C_4) alkenyl group, an allyloxyalkyl group having up to 12 carbon atoms, or an allyloxyalkoxyalkyl group having up to 12 carbon atoms,

and, optionally, mers derivable from other anionically copolymerizable monomers, and wherein n, the average chain length of the polymer is about 6 to 50 mers; the polmerization being carried out, in the presence of an alcohol and a catalytic amount of an alkoxide, using controlled rates of addition of at least one of the ester, the alcohol and the alkoxide.

4,059,617

SYNTHESIS OF DIMETHYLAMINOETHYL METHYLMETHACRYLATE

Terence Foster, Clayton, and Thomas Stephen Dawson, Guiseley, both of England, assignors to American Cyanamid Company, Stamford, Conn.

Filed Apr. 29, 1976, Ser. No. 681,679

Int. Cl.² C07C *69/54*

U.S. Cl. 560—222 **5 Claims**

1. In the synthesis of dimethylaminoethyl methacrylate by reaction of dimethylaminoethanol with methylmethacrylate in presence of a phenoxide catalyst under reflux conditions with removal of methanol-methylmethacrylate azeotrope by distillation as methanol is produced, the improvement wherein the sodium phenoxide catalyst is selected from sodium phenoxide and sodium 4-methoxyphenoxide and wherein the dimethylaminoethanol reactant is added continuously or regularly in small increments to the reaction mixture from the start and throughout the course of the reaction at a rate about the same as the rate at which the alcohol reactant is consumed.

4,059,618

TETRAHALOGEN XYLYLENE DIACRYLATES, TETRAHALOGEN XYLYL ACRYLATES, PENTAHALOGEN BENZYL ACRYLATES, AND SUBSTITUTED ACRYLATES

Georg Blumenfeld, St. Augustin; Hermann Richtzenhain, Much, Schwellbach; Wilhelm Vogt, Cologne-Sulz, and Norbert Volkommer, Troisdorf, all of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf Bez. Cologne, Germany

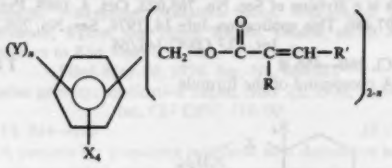
Filed June 24, 1975, Ser. No. 589,958

Claims priority, application Germany, June 26, 1974, 2430629; Feb. 27, 1974, 2408468

Int. Cl.² C07C *69/54*

U.S. Cl. 560—221 **8 Claims**

1. Compound of the formula:



wherein:

each X is chloro or bromo

Y is methyl or bromo

n is 0 or 1

each of R and R′ is hydrogen or methyl

4,059,619

PROCESS FOR THE PREPARATION OF PERCARBOXYLIC ACID SOLUTIONS

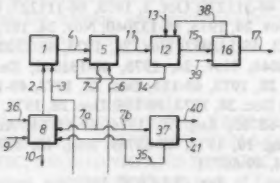
Günter Prescher; Gerd Schreyer, both of Hanau; Otto Weiberg, Neu-Isenburg; Rolf Wirthwein, Hanau; Helmut Waldmann, Leverkusen; Hermann Seifert, Cologne; Wulf Schwerdtel, Leverkusen, and Wolfgang Swodenk, Odenthal, all of Germany, assignors to Deutsche Gold-und Silber-Scheideanstalt Vormals Roessler, Frankfurt am Main and Bayer Aktiengesellschaft, Leverkusen, both of, Germany

Filed Apr. 28, 1976, Ser. No. 678,828

Claims priority, application Germany, Apr. 30, 1975, 2519289

Int. Cl.² C07C *179/10*; C01B *15/02*

U.S. Cl. 260—502 R **17 Claims**



1. In a process for the continuous production of a substantially anhydrous solution of perpropionic acid in benzene which comprises contacting aqueous hydrogen peroxide with propionic acid in the presence of sulfuric acid as catalyst for

the reaction to produce the perpropionic acid and water, extracting the reaction mixture with benzene for formation of a benzene phase rich in perpropionic acid and propionic acid and containing hydrogen peroxide, and an aqueous raffinate phase rich in hydrogen peroxide and catalyst, after-treating said benzene phase by extraction with water for formation of an after-treated benzene phase containing perpropionic acid, propionic acid, water, and a reduced amount of hydrogen peroxide, and aqueous phase containing hydrogen peroxide, recycling said aqueous phase containing hydrogen peroxide to the extraction of the reaction mixture for extraction thereof with benzene, dehydrating the after-treated benzene phase by azeotropic distillation to produce said substantially anhydrous solution of perpropionic acid in benzene and an aqueous phase containing hydrogen peroxide, distilling aqueous raffinate of the benzene extraction under reduced pressure to remove water therefrom and form a concentrated solution of hydrogen peroxide and catalyst, recycling said concentrated solution to said contacting of hydrogen peroxide and propionic acid, and introducing make-up hydrogen peroxide and propionic acid into said contacting step, the improvement which comprises:

a. in said contacting step, the molar ratio of hydrogen peroxide: propionic acid being 0.8 – 1.4 : 1, the reaction temperature being 20°–60° C, the ratio of hydrogen peroxide: water by weight before the start of the reaction thereof with propionic acid based on 100% hydrogen peroxide being up to 1.2, and the concentration of sulfuric acid in the reaction mixture being 10 to 40% by weight;
b. the extraction of the after-treatment being performed in at least three stages by passing the benzene phase serially through the three stages and in each stage extracting with water or water containing hydrogen peroxide, the aqueous phase containing hydrogen peroxide produced in said azeotropic distillation being introduced into the first state, and employed as an extracting agent therein, and aqueous phase containing hydrogen peroxide being withdrawn from the first stage, the extraction in the second and subsequent stages being carried out with fresh water which is introduced into the final stage and is withdrawn from the second stage as an aqueous phase containing hydrogen peroxide, and recycling the withdrawn aqueous phases from the first and second stages to the extraction of the reaction mixture for extraction thereof with benzene;
c. employing aqueous hydrogen peroxide for the make-up of hydrogen peroxide, introducing at least part of the make-up aqueous hydrogen peroxide and at least part of the aqueous raffinate directly into the raffinate distillation, and in said raffinate distillation distilling off an amount of water about equal to the sum of the water in the aqueous hydrogen peroxide used as said make-up, the water formed during said contacting and the water introduced in said after-treatment, and withdrawing a sump product comprising a mixture of hydrogen peroxide, sulfuric acid, and water and recycling said sump mixture to said contacting, the raffinate distillation being performed in a rectification unit which at least in part consists essentially of a metal of the group tantalum, tantalum alloy, zirconium and zirconium alloy for reduction of decomposition of hydrogen peroxide, the residence time in the sump of the distillation column being 3–30 minutes, and the sump temperature of said raffinate distillation being 40° – 120° C;
d. impurities accumulating in the process, and controlling the level of impurities by withdrawl of impurities from the process.

4,059,620

PROCESS FOR PREPARING OLEFIN SULFONATES

Fred Lowery Johnson, Jr., Austin, Tex., assignor to Texaco Development Corporation, New York, N.Y.

Filed May 17, 1973, Ser. No. 361,264

Int. Cl.² C07C *139/00*

U.S. Cl. 260—513 T **7 Claims**

1. In the process for preparing olefin sulfonates by the reaction of sulfur trioxide and an olefin feed mixture in a continuous falling film reactor apparatus to produce an acid reaction effluent followed by aging and neutralization to convert said effluent to an olefin sulfonate, wherein the improvement comprises:

mixing and reacting a mixture of olefins having 14 to 16 carbon atoms per molecule, at least 30 percent by weight to 70 percent by weight of said olefin mixture being dimer olefins, and sulfur trioxide in a reaction zone of a continuous falling film reactor apparatus;

operating and maintaining the upper ⅓ to ½ of the reaction zone at a constant temperature of between about 0° C. to below about 10° C.;

operating and maintaining the lower ⅔ to ½ of said reaction zone at a higher constant temperature of between about 25° C. to about 40° C.; and

aging the resultant acidic reaction effluent at a temperature of about 20°–45° C. prior to neutralization.

4,059,621

SUBSTITUTED BENZAMIDO PROPANOLAMINES

Michel Vincent, Bagneux; Georges Rémond, Versailles, and Michel Laubie, Vaucresson, all of France, assignors to Science Union et Cie, Societe Francaise de Recherche Medicale, Suresnes, France

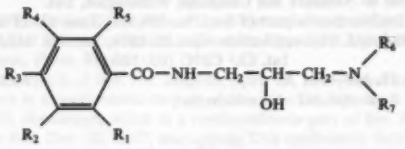
Filed July 16, 1973, Ser. No. 379,529

Claims priority, application United Kingdom, July 21, 1972, 34213/72

Int. Cl.² C07C *103/22, 103/26, 103/28, 103/29, 103/76;* A61K *31/165*

U.S. Cl. 260—558 R **6 Claims**

1. A compound selected from the group consisting of: - A propanol derivative having the formula I:



wherein:

R_1 represents a hydrogen or halogen atom, an alkyl, alkenyl, alkoxy or an alkenyloxy radical having from 1 to 5 carbon atoms, or carbamoyl radical;

R_2 represents a hydrogen atom, a hydroxy radical, an alkoxy radical having from 1 to 5 carbon atoms or a phenyl alkoxy radical wherein the alkoxy moiety has from 1 to 5 carbon atoms;

R_3 represents a hydrogen atom, a hydroxy radical, an alkoxy radical having from 1 to 5 carbon atoms, a phenyl alkoxy radical wherein the alkoxy moiety has from 1 to 5 carbon atoms, a nitro radical or an amino radical;

or R_1 and R_2 together or R_2 and R_3 together represent the —CH=CH—CH=CH moiety;

R_4 represents a hydrogen atom,

R_5 is selected from the group consisting of alkyl radicals having from 1 to 5 carbon atoms;

R_6 is selected from the group consisting of a hydrogen atom, a lower alkyl radical, a lower alkenyl radical and a benzyl radical;

R_7 is selected from the group consisting of a lower alkyl radical, a lower alkenyl and a phenyl lower alkyl radical wherein the lower alkyl moiety has 1 – 5 carbon atoms.

4,059,622

ALKANOLAMINE DERIVATIVES

David James Le Count, and Christopher John Squire, both of Macclesfield, England, assignors to Imperial Chemical Industries Limited, London, England

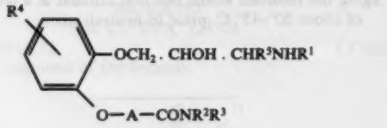
Continuation-in-part of Ser. No. 431,297, Jan. 7, 1974, Pat. No. 3,959,486, which is a continuation of Ser. No. 145,897, May 21, 1971, abandoned, and a continuation-in-part of Ser. No. 332,517, Feb. 14, 1973, abandoned. This application Feb. 26, 1974, Ser. No. 445,854

Claims priority, application United Kingdom, May 27, 1970, 25529/70; Nov. 20, 1970, 55246/70; Mar. 21, 1972, 13159/72

Int. Cl.[2] C07C *103/26;* A61K *31/165*

U.S. Cl. 260—559 A 3 Claims

1. An alkanolamine derivative selected from the group consisting of compounds of the formula:



wherein R^1 is hydrogen or alkyl, hydroxyalkyl or alkenyl each of up to 6 carbon atoms; wherein R^2 is hydrogen or alkyl of up to 6 carbon atoms; wherein R^3 is hydrogen, or alkyl, hydroxyalkyl or alkoxyalkyl each of up to 10 carbon atoms, or cycloalkyl or alkenyl each of up to 6 carbon atoms, or phenylalkyl of up to 12 carbon atoms; wherein R^4 is hydrogen, or halogen, or alkyl or alkoxy each of up to 6 carbon atoms, or hydroxy; wherein R^5 is hydrogen or alkyl of up to 6 carbon atoms; and wherein A is straight-or branched-chain alkylene of up up to 4 carbon atoms; and the non-toxic, pharmaceutically acceptable acid-addition salts thereof.

4,059,623

BUTYRAMIDES AND BUTYRATES

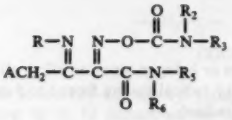
Russell Frank Bellina, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 369,606, June 13, 1973, abandoned. This application Apr. 25, 1974, Ser. No. 463,987

Int. Cl.[2] C07C *103/127*

U.S. Cl. 260—561 A 9 Claims

1. A compound of the formula



wherein:

A is hydrogen or methyl;

R is C_1–C_{18} alkyl; C_3–C_4 alkenyl; C_5–C_7 cycloalkyl optionally substituted with methoxy or with 1 or 2 methyl groups; C_6–C_8 cycloalkylalkyl; C_1–C_3 alkoxy; alkoxyalkyl with a total of 3–6 carbon atoms; benzyl; phenethyl;

R_1 is hydrogen, methyl, methoxy, $(CH_3)_2N$—, CH_3S—, or flourine;

R_2 is hydrogen, methyl, or ethyl;

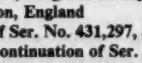
R_3 is methyl; ethyl, or allyl;

R_5 is methoxy, C_1–C_4 alkyl or allyl;

R_6 is hydrogen, methyl, or ethyl;

R_5 and R_6 can be taken together to form a ring and are

$-(CH_2)_2O(CH_2)_2-$;



or $-(CH_2)_n-$; and

n is 4–6;

provided that the total carbon content of R_2, R_3, R_5 and R_6 is no greater than 8C.

4,059,624

INSOLUBILIZED SALTS OF 1,6-DI-p-(CHLOROPHENYL BIGUANIDO) HEXANE

Michael Harrison, Newcastle-upon-Tyne, England, assignor to Colgate Palmolive Company, New York, N.Y.

Division of Ser. No. 424,388, Dec. 13, 1973, Pat. No. 3,937,805, which is a continuation-in-part of Ser. No. 197,498, Nov. 10, 1971, abandoned. This application Nov. 10, 1975, Ser. No. 630,390

Claims priority, application United Kingdom, Nov. 27, 1970, 56578/70

Int. Cl.[2] C07C *129/08;* C09F *5/00;* A61K *7/18, 7/22*

U.S. Cl. 260—565 1 Claim

1. The water-insoluble salt of 1,6-di(p-chlorophenyl biguanido)hexane cation and polyvalent monofluorophosphate anion prepared by reacting in aqueous solution 1,6-di-(p-chlorophenyl biguanido)hexane of soluble salt thereof with a monofluorophosphate to form said salt with moieties of said anion having the structure

. . . + Chlorhexidine +− Anion −+ Chlorhexidine + ...

4,059,625

CERTAIN OXIME COMPOSITIONS AND THEIR USE IN CONTROLLING FUNGI

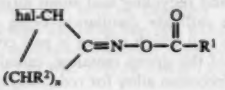
Don R. Baker, Orinda, and Arnold D. Gutman, Berkeley, both of Calif., assignors to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 554,288, Feb. 28, 1975, Pat. No. 4,007,227, which is a division of Ser. No. 330,764, Feb. 8, 1973, Pat. No. 3,885,043, which is a continuation of Ser. No. 875,576, Nov. 10, 1969, abandoned. This application Nov. 15, 1976, Ser. No. 741,585

Int. Cl.[2] C07C *131/02, 131/06*

U.S. Cl. 260—566 AE 3 Claims

1. A compound having the formula



wherein n equals 4–6 and R^1 is selected from the group consisting of bromomethyl, methyl vinyl, chloromethyl vinyl and trichloromethyl.

4,059,626

TRIFLUOROETHYLANILINES

Louis Foulletier, Oullins; Jacques Pierre Edmond Pechmeze, Paris, and Robert Frederic Michel Sureau, Enghien les Bains, all of France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France

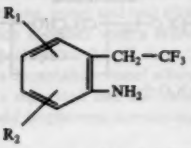
Filed Mar. 26, 1975, Ser. No. 562,063

Claims priority, application France, Mar. 29, 1974, 74.11263

Int. Cl.[2] C07C *87/52, 87/56, 91/44, 93/14*

U.S. Cl. 260—578 2 Claims

1. Compound of the formula:



in which R_1 is hydrogen, chlorine, bromine or nitro and R_2 is hydrogen, chlorine or bromine.

4,059,627

CHLORINATED AROMATIC AMINES

Helmuth Kritzler, Odenthal; Walter Bohm, Leverkusen; Wolfgang Kiel, Schildgen, and Udo Birkenstock, Ratingen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Nov. 1, 1976, Ser. No. 737,645

Claims priority, application Germany, Nov. 6, 1975, 2549900

Int. Cl.² C07C *85/11*

U.S. Cl. 260—580 **13 Claims**

1. In a process for the preparation of the chlorinated aromatic amine by a hydrogenation of the corresponding chlorinated nitro-aromatic compound in the presence of a noble metal catalyst on a carbon support and in the co-presence of a sulfur compound, the improvement in that the sulfur compound is a thio-ether.

4,059,628

PREPARATION OF AROMATIC AMINES

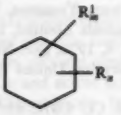
Thomas Wayne Del Pesco, and Frank Julian Weigert, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 536,584, Dec. 26, 1974, abandoned, which is a continuation-in-part of Ser. No. 445,914, Feb. 26, 1974, abandoned. This application May 17, 1976, Ser. No. 687,175

Int. Cl.² C07C *85/18, 85/24*

U.S. Cl. 260—581 **38 Claims**

1. The process which consists essentially in heating a starting hydrocarbon of the formula

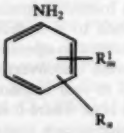


wherein

R and R^1 are alkyl of 1–4 carbon atoms and

m and *n* are 0 or 1

with anhydrous ammonia at a temperature range of 300°–650° C in the absence of air to produce a compound of the formula



where R, R^1, *m* and *n* have the values stated above and where the heating is carried out in the presence of a catalyst selected from the group consisting of:

A. one or more oxides of Al, Cd, Ce, Fe, In, Sn, Th, Ti, Zn and Zr;

B. vanadium oxide and one or more oxides of Ag, As, Ba, Ca, Cd, Ce, Co, Cu, Eu, Fe, Gd, Hf, In, La, Mg, Mn, Ni, P, Pb, Sb, Sn, Sr, Ti, U and Zn;

C. titanium oxide and one or more oxides of Bi, Cr, Cu, Mo, Pb, U and W;

D. zinc oxide and one or more oxides of Cr, La, Mg, P, Si, Sb, W and the pair Bi-Mo;

E. aluminum oxide and one or more oxides of Cu, Eu, La, Mn, Pb, and U;

F. aluminum oxide, molybdeum oxide and one or more oxides of Ca, Cd, Ce, Cu, Er, Fe, In, La, Ni, Pb, Sm, Sr, Ti, U, Y and Zn;

G. aluminum oxide, tungsten oxide and one or more oxides of Ca, Ce, Cu, Fe, In, La, Pb, Sm, Ti, U and Zn;

H. aluminum oxide, titanium oxide and one or more oxides of Cr, Mg, rare earths, Re, Te and V;

I. aluminum oxide, titanium oxide, zinc oxide and one or more oxides of Ag, Bi, Ca, Co, Cr, Cu, Hg, La, Mg, Nb, Ni, Pb, Pr, Ru, Sm, Sr, V, Yb, and Y;

J. aluminum oxide, molybdenum oxide, bismuth oxide and one or more oxides of Ca, Cu, Pb, Ti, and Zn;

K. aluminum oxide, molybdenum oxide, zirconium oxide and one or more oxides of Ce, Ti, and Zn;

L. molybdenum oxide and one or more oxides of Cd, Ce, Cu, Fe, Gd, La, Mg, Mn, Nb, P, Pb, Ti and Zn;

M. zinc oxide, titanium oxide and one or more oxides of Cr, La, Mg and Nb;

N. CdS; CoS; CdS/aluminum oxide; CdS/titanium oxide/aluminum oxide; chromium sulfide; ZnSe; ZnS; ZnTe; ZnS/aluminum oxide; CdS/ZnS/aluminum oxide and WS_2; and

O. aluminum oxide, vanadium oxide and one or more oxides of Ag, Ba, Ca, Cd, Cu, Ga, In, La, Mg, Pb, Sr, Y, Zn, and Zr.

4,059,629

PERFLUOROALIPHATIC SUBSTITUTED AMINE MIXTURES AND THE METHOD FOR PREPARING THE SAME

Louis Foulletier, Ouillins, and Jean-Pierre Lalu, La Mulatiere, both of France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France

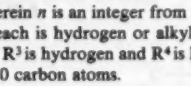
Continuation of Ser. No. 138,748, April 29, 1971, abandoned, which is a continuation-in-part of Ser. No. 819,481, April 25, 1969, abandoned, which is a continuation-in-part of Ser. No. 694,045, Dec. 28, 1967, abandoned. This application July 3, 1975, Ser. No. 593,173

Claims priority, application France, Dec. 29, 1972, 70.30550

Int. Cl.² C07C *87/127, 87/22, 87/26, 87/32*

U.S. Cl. 260—583 GG **4 Claims**

1. A perfluoroalkyl substituted amine of the formula



wherein *n* is an integer from 1 to about 20, *m* is 2 or 4, R^1 and R^2 each is hydrogen or alkyl containing 1 to 3 carbon atoms and R^3 is hydrogen and R^4 is hydrogen or alkenyl containing 3 to 10 carbon atoms.

4,059,630

ANTI-ANDROGENIC STEROIDS

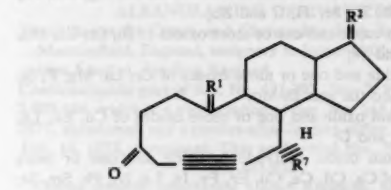
Cecil H. Robinson, Pylesville, Md., assignor to The Johns Hopkins University, Baltimore, Md.

Filed Feb. 26, 1976, Ser. No. 661,792

Int. Cl.² C07C *49/45*

U.S. Cl. 260—586 E **3 Claims**

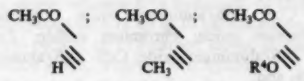
1. A 5,10-secosteroid of the formula:



wherein R^1 is $CH_2=$, O = or

R^2 is O =,

(where R^3 is H or lower alkanoyl);



(where R^4 is H or lower alkanoyl);

(where R^5 is lower alkyl) or

(where R^6 is H, lower alkyl or Cl); and R^7 is H or CH_3.

4,059,631

POLYCHLOROHYDRIN ETHERS OF TRIS-(HYDROXYMETHYL)-AMINOMETHANE

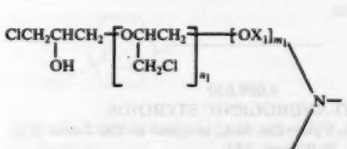
Richard Hochreuter, Oberwil, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

Division of Ser. No. 503,831, Sept. 6, 1974, Pat. No. 3,987,231. This application July 9, 1976, Ser. No. 703,751

Int. Cl.[2] C07C *87/06, 43/10*

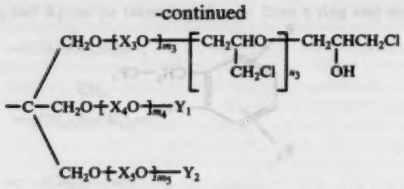
U.S. Cl. 260—584 B **8 Claims**

1. A compound of formula I,



I

-continued



wherein

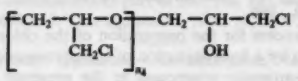
X_1, X_2, X_3, X_4 and X_5 are each, independently, 1,2-ethylene, 1,2-propylene or 1,2-butylene,

m_1 and m_2 are each, independently, an integer 1 to 30,

m_3, m_4 and m_5 are each, independently, 0 or an integer 1 to 30,

n_1, n_2 and n_3 are each, independently, 0 or an integer 1 or 2,

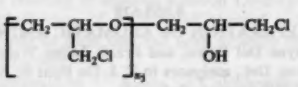
Y_1 is hydrogen or a radical of the formula



wherein

n_4 is 0 or an integer 1 or 2, and

Y_2 is hydrogen or a radical of the formula



wherein

n_5 is 0 or an integer 1 or 2,

and wherein the sum of m_1, m_2, m_3, m_4 and m_5 is an integer 2 to 100,

and the sum of n_1, n_2, n_3, n_4 and n_5 is 0 or an integer 1 to 7.

4,059,632

PROCESS FOR THE PRODUCTION OF ISOPHORONE

Charles Cane, and Bertram Yeomans, both of Hull, England, assignors to BP Chemicals Limited, London, England

Filed Oct. 4, 1976, Ser. No. 728,922

Claims priority, application United Kingdom, Oct. 20, 1975, 42911/75

Int. Cl.[2] C07C *45/00*

U.S. Cl. 260—586 C **10 Claims**

1. A process for the production of isophorone which process consists of continuously feeding a mixture consisting of acetone, water and an alkali catalyst to an intermediate point in a reaction zone within a column operating at elevated temperature and pressure at such a rate as to maintain an acetone/water azeotrope reflux having an alkali concentration of less than 0.1% w/w within said reaction zone, passing from the bottom of said reaction zone a fraction containing isophorone, water and unconverted acetone to a hydrolysis zone within said column or a second column also operating at elevated temperature and pressure wherein unconverted acetone is separated overhead and returned to said reaction zone, removing at a point in said hydrolysis zone where it acetone concentration is less than 30% w/w a side-stream containing isophorone, acetone, water and colour-forming compounds, passing said side-stream to a distillation zone wherein actor and water are removed in a heading distillation, contacting the base product consisting of isophorone and colour-forming compounds from said heading distillation with a strong acid at elevated temperature and recovering isophorone substantially free from colour-forming compounds overhead in a tailing distillation, remov-

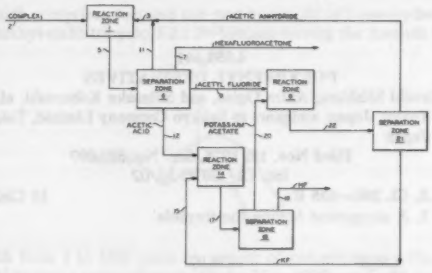
ing from the base of said hydrolysis zone a bottoms fraction consisting of isophorone, water and said alkali catalyst, feeding said bottoms fraction together with a sufficient quantity of a strong mineral acid to reduce the pH thereof to a value within the range 5 to 9 to a decantation vessel wherein an isophorone-containing phase is separated and thereafter recovering said isophorone from said isophorone-containing phase.

4,059,633

RECOVERY OF HEXAFLUOROACETONE FROM A HEXAFLUOROACETONE-HF CONTROL

William V. Childs, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Aug. 15, 1975, Ser. No. 605,124
Int. Cl.² C07C *49/16*
U.S. Cl. 260—593 H 8 Claims



1. A process of removing hexafluoroacetone from a hexafluoroacetone-HF complex, represented by the formula

$$CF_3\overset{O}{\overset{\|}{C}}CF_3 \cdot HF$$

comprising the steps of:

a. contacting said hexafluoroacetone-HF complex with acetic anhydride under suitable reaction conditions to produce a first reaction effluent comprising hexafluoroacetone, acetyl fluoride and acetic acid; and

b. separating hexafluoroacetone from said first reaction effluent.

4,059,634

PRODUCTION OF PINACOLONE

Donovan Norman Smith, Jr., Kansas City, Mo., assignor to Mobay Chemical Corporation, Pittsburgh, Pa.

Filed Dec. 15, 1975, Ser. No. 640,828
Int. Cl.² C07C *45/00*
U.S. Cl. 260—593 R 6 Claims

1. In the process wherein 4,4,5-trimethyl-1,3-dioxane is contacted with aqueous acid to produce pinacolone, the improvement which comprises slowly adding the 4,4,5-trimethyl-1,3-dioxane and approximately an equimolar amount of 2-methylbut-2-ene to stirred aqueous hydrogen halide acid having a concentration of about 20 to 60%, whereby the yield of pinacolone is increased.

4,059,635

SUBSTITUTED DERIVATIVES OF 1,1-DICHLOROALKENE-1 AND THEIR PREPARATION AND USES

Hironari Sugiyama, 166-20 Kitawaki; Isao Chiyomaru, 215 Kitawaki; Itsuki Okuda, 637-7 Wakakusa-cho, all of Shimizu, Shizuoka; Hisaaki Yamamoto, 3353 Kamo, Kikukawa-cho, Ogasa, Shizuoka, and Hideo Ito, 96 Funahara-cho, Shimizu, Shizuoka, all of Japan

Filed Oct. 6, 1969, Ser. No. 864,224
Claims priority, application Japan, July 15, 1969, 44-55445; Feb. 19, 1969, 44-1829; Feb. 13, 1969, 44-10088
Int. Cl.² C07C *149/08, 149/34, 149/16*
U.S. Cl. 260—609 E 6 Claims

1. 7-(Para-chlorophenylthio)-1,1-dichloroheptene-1.

4,059,636

MERCAPTANS BY CATALYTIC CLEAVAGE OF ORGANIC SULFIDES

Donald H. Kubicek, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed May 4, 1976, Ser. No. 682,934
Int. Cl.² C07C *148/00*
U.S. Cl. 260—609 D 8 Claims

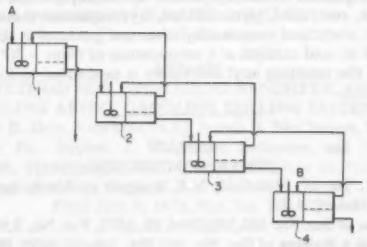
1. A method in which mercaptans are prepared by catalytic cleavage of organic sulfides with hydrogen sulfide in the presence of a supported phosphotungstic acid catalyst at a temperature and pressure sufficient for catalytic cleavage of organic sulfides.

4,059,637

METHOD FOR EXTRACTION OF DIHYDROPEROXIDE

Hirokazu Hosaka; Kenji Tanimoto, both of Hirakata; Hiromichi Okabe; Kunthiko Tanaka, both of Ibaraki; Yuji Ueda, Izumiotsu, and Iwao Dohgane, Ashiya, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Aug. 22, 1975, Ser. No. 607,020
Claims priority, application Japan, Sept. 3, 1974, 49-101634
Int. Cl.² C07C *179/02*
U.S. Cl. 260—610 A 6 Claims



1. A method for extracting a dihydroperoxide of a dialkylbenzene of the formula,

wherein each R_1, R_2, R_3 and R_4 is independently isopropyl or sec.butyl, from an aqueous alkali solution of the said dihydroperoxide with at least one organic solvent selected from the group consisting of C_4–C_{10} ketones, C_4–C_{10} ethers and C_4–C_8 alcohols, which comprises extracting the dihydroperoxide by a countercurrent multi-stage extraction with a temperature gradient between each stage and with all of the extractions being conducted at a temperature of from 0° to 85° C, the aqueous

alkali solution being fed to the lower temperature zone, the organic solvent being fed to the higher temperature zone with said lower temperature being from 0° to 50° C, and said higher temperature being from 50° to 85° C, and each aqueous alkali solution and organic solvent being fed countercurrently, whereby the dihydroperoxide is obtained in the form of organic solvent solution from the lower temperature zone.

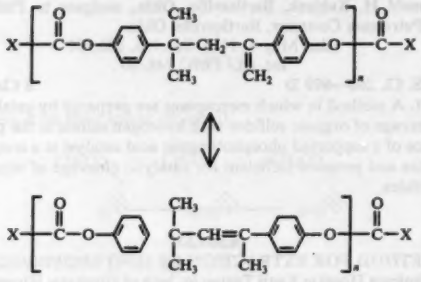
4,059,638

TRISPHENOL PROCESS

Heinrich Krimm, and Erhard Tresper, both of Krefeld, Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed Feb. 24, 1976, Ser. No. 660,876
Claims priority, application Germany, Feb. 28, 1975, 2508709
Int. Cl.² C07C *41/06, 37/00*
U.S. Cl. 260—613 R **3 Claims**

1. A process for the production of a trisphenol wherein a compound of the formula



wherein: X represents a C_1–C_6 aliphatic group, a C_1–C_4 alkoxy group, a phenoxy group, a phenyl group optionally substituted by halogen, nitro or C_1–C_4 alkyl, or chlorine and n is an integer from 1 to 50, is reacted with a phenol selected from the group consisting of phenol, cresol, chlorophenol, 2,6-dichlorophenol, bromophenol, ethylphenol, propylphenol, isopropylphenol, butylphenol, isobutylphenol, tert.butylphenol, nonylphenol, dodecylphenol, 2,4-dimethylphenol, 3,4-dimethylphenol, 2,6-dimethylphenol, 2,6-diethylphenol, cyclohexylphenol, hydroquinone, resorcinol, pyrocatechol, hydroquinone monomethylether, resorcinol monomethylether and guaiacol in the presence of an acid catalyst at a temperature of from −20° to 30° C. and the resulting acyl derivative is saponified to form the trisphenol.

4,059,639

ETHER COMPOUNDS

Ross C. Terrell, Plainfield, N.J., assignor to Airco, Inc., New Providence, N.J.

Division of Ser. No. 633,763, Nov. 20, 1975, Pat. No. 3,987,111, which is a division of Ser. No. 367,596, June 6, 1973, Pat. No. 3,947,595, which is a division of Ser. No. 170,954, Aug. 11, 1971, Pat. No. 3,764,706. This application July 14, 1976, Ser. No. 705,369
Int. Cl.² C07L *43/12;* A61K *31/08*
U.S. Cl. 260—614 F **1 Claim**

1. The compound having the formula $CF_3CHFOCF_2CHCl_2$.

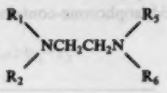
4,059,640

TRANSALKYLATION OF TERTIARY AMINES AND ALCOHOLS, TO PRODUCE ETHYLENE GLYCOL

Richard W. Goetz, Cincinnati, Ohio, assignor to National Distillers and Chemical Corporation, New York, N.Y.

Filed Oct. 28, 1975, Ser. No. 625,801
Int. Cl.² C07C *29/00*
U.S. Cl. 260—635 R **6 Claims**

1. A method of producing ethylene glycol comprising reacting at a temperature of from about 50°to 300° C. a tertiary amine with an alkyl, cycloakyl, aralkyl or acylcycloalkyl alcohol containing up to 10 carbon atoms in the presence of carbon monoxide or with the formate ester of said alcohol, said tertiary amine being triethylenediamine or an amine of the formula



wherein each of R_1, R_2, R_5 and R_6 is an acylcic aliphatic hydrocarbon radical of up to 10 carbon atoms or a substituted acyclic aliphatic hydrocarbon radical wherein the substituent is hydroxy, alkoxy of up to 10 carbon atoms or alkanoyl of up to 10 carbon atoms.

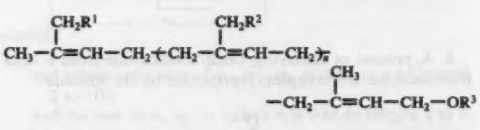
4,059,641

POLYPRENYL DERIVATIVES

Hiroshi Mishima; Akira Ogiso, and Shinsaku Kobayashi, all of Tokyo, Japan, assignors to Sankyo Company Limited, Tokyo, Japan

Filed Nov. 18, 1975, Ser. No. 633,097
Int. Cl.² C07C *33/02*
U.S. Cl. 260—635 R **11 Claims**

1. A compound having the formula



in which R^1 and R^2 may be the same or different and each represents a hydrogen atom or a hydroxyl group, R^3 represents a hydrogen atom, *n* is an integer of 1–4 provided at least one of R^1 and R^2 is a hydroxyl group, said compound being in substantially pure form.

4,059,642

PREFERENTIAL ALKYLATION OR ACYLATION OF META-DISUBSTITUTED BENZENES

James R. Dewald, Bay City, Mich., and Lowell D. Markley, Clayton, Calif., assignors to The Dow Chemical Company, Midland, Mich.

Filed July 22, 1976, Ser. No. 707,924
Int. Cl.² C07C *25/08*
U.S. Cl. 260—650 R **11 Claims**

1. In an isomeric mixture comprising para- and meta-disubstituted benzenes having two halogen substituents, a process for the alkylation of the meta-disubstituted benzene which process comprises contacting the isomeric mixture with an alkylating agent in the presence of a catalytic amount of a Friedel-Crafts catalyst at a reaction temperature less than about 60° C such that the meta-disubstituted benzene is preferentially alkylated.

4,059,643

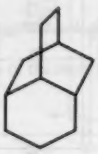
PROCESS FOR HYDRIDE TRANSFER REDUCTION REARRANGEMENT OF 8-EXO-HYDROXYMETHYL-ENDO-TRICYCLO 5.2.1.$0^{2,6}$] DECANE TO FORM TRICYCLO[5.3.1.$0^{3,8}$] UNDECANE

Yoshiaki Inamoto; Yoshiaki Fujikura, both of Wakayama; Kiyoshi Tsuchihashi, Kainan, and Eiji Kashihara, Wakayama, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Nov. 26, 1976, Ser. No. 744,957
Claims priority, application Japan, Dec. 4, 1975, 50-144673
Int. Cl.² C07C *13/54*
U.S. Cl. 260—666 PY 6 Claims

1. A process for preparing tricyclo[5.3.1.$0^{3,8}$]undecane having the formula (II),

(II)



which comprises, reacting one part by weight of 8-exo-hydroxymethyl-endo-tricyclo[5.2.1.$0^{2,6}$]decane having the formula (I)

(I)

with from 1 to 1000 parts by weight of concentrated sulfuric acid having a concentration of from 75 to 100%, and with from 1 to 1000 parts by weight of a hydrocarbon selected from the group consistingof n-pentane, n-hexane, n-heptane, n-octane, cyclopentane, cyclohexane, cyclooctane, methylcyclohexane, isooctane, petroleum ether and mixtures thereof, at a temperature of from −20° C to 100° C, until a substantial quantity of the formula (II) compound is formed, and recovering the formula (II) compound from the reaction mixture.

4,059,644

HIGH DENSITY FUELS

Lawrence G. Cannell, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Feb. 12, 1976, Ser. No. 657,413
Int. Cl.² C07C *13/00, 13/28*
U.S. Cl. 260—666 PY 7 Claims

1. A process for making high density fuel which comprises
   a. heating a mixture of cyclopentadiene dimer and methylcyclopentadiene dimer at a temperature of 150°-250° C for from 10 minutes to 3 hours provided that any oxygen present will not exceed 0.1%wt of the mixture, then
   b. hydrogenating the product of step (a) by reaction with sufficient hydrogen to completely saturate the olfinically unsaturated bonds of said product and in the presence of a hydrogenation catalyst at a temperature of from 25°-160° C and a hydrogen pressure of from 150–800 psig.

4,059,645

ALKYLAROMATIC ISOMERIZATION PROCESS

Robert L. Jacobson, Pinole, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Nov. 10, 1976, Ser. No. 740,580
Int. Cl.² C07C *5/24*
U.S. Cl. 260—668 A 5 Claims

1. In a process for isomerizing an alkylaromatic hydrocarbon by contacting a feed including said hydrocarbon and hydrogen with a catalyst including 0.01–3 weight percent platinum and 0.01–3 weight percent rhenium on an alumina support at isomerization conditions including a temperature of 700° F to 900° F and a hydrogen pressure between 100 psi and 300 psi, the improved method for increasing the activity and selectivity of said catalyst in said process comprising: including in said catalyst greater than 1.2 weight percent combined chloride and contacting said feed with said catalyst in the presence of between 1.5 and 150 ppm, by volume, of free chloride and not more than 10 ppm, by volume, of water, based on the volume of said feed.

4,059,646

PROCESS FOR PRODUCING TRIPTANE BY CONTACTING METHANOL OR DIMETHYL ETHER WITH ZINC BROMIDE

Milton M. Wald, and Leo Kim, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Oct. 2, 1975, Ser. No. 619,117
Int. Cl.² C07C *1/20, 9/16*
U.S. Cl. 260—676 R 7 Claims

1. A method for the production of triptane comprising contacting a material selected from the group consisting of methanol; dimethyl ether; other materials which react to provide methanol in situ, other reaction products, if any, being noninterfering; and mixtures thereof, with an effective amount of $ZnBr_2$ at a temperature of from 210° to 245° C.

4,059,647

PROCESS FOR PRODUCING TRIPTANE BY CONTACTING METHANOL OR DIMETHYL ETHER WITH ZINC CHLORIDE

Milton M. Wald, and Leo Kim, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Oct. 2, 1975, Ser. No. 619,118
Int. Cl.² C07C *1/20, 9/16*
U.S. Cl. 260—676 R 7 Claims

1. A method for the production of triptane comprising contacting a material selected from the group consisting of methanol; dimethyl ether; other materials which react to provide methanol in situ, other reaction products, if any, being noninterfering; and mixtures thereof, with an effective amount of ZnI_2 at a temperature of from 180° to 245° C.

4,059,648

METHOD FOR UPGRADING SYNTHETIC OILS BOILING ABOVE GASOLINE BOILING MATERIAL

Walter R. Derr, Voorhees, N.J.; Joseph R. McClernon, Morrisville, Pa.; Stephen J. McGovern, Bellmawr, and Fritz A. Smith, Haddonfield, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

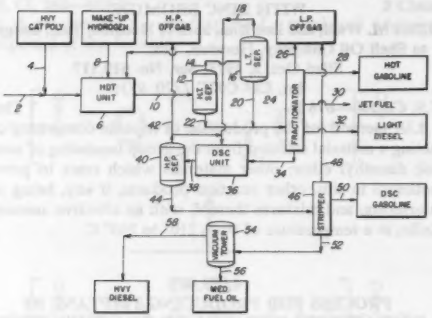
Filed July 9, 1976, Ser. No. 703,887
Int. Cl.² C07C *1/04*
U.S. Cl. 260—676 R 4 Claims

1. A method for upgrading a product of Fischer-Tropsch synthesis boiling above 300° F comprising hydrocarbons and oxygenates which comprises,
   hydrogenating said product of Fischer-Tropsch synthesis boiling above 300° F at a temperature within the range of 450° F to 850° F and a hydrogen partial pressure of at least 200 psia by contact with a sulfided hydrogenation catalyst,
   separating the product effluent of said hydrogenation operation in a high temperature separator into a first low boiling fraction and a first higher boiling fraction, separating the thus obtained first low boiling fraction in a lower temperature separator into a first hydrogen rich recycle gas stream and a second higher boiling product stream,
   passing the separated first and second higher boiling streams of said high and lower temperature separation zones to a lower pressure separation zone maintained at a tempera-

ture within the range of 100° F to 800° F to recover a low pressure fuel gas stream, a gasoline product stream, a light diesel fuel product stream and a hydrogenated higher boiling product stream boiling above about 500° F,

selectively converting said separated hydrogenated product stream boiling above about 500° F by contacting a crystalline zeolite conversion catalyst providing a pore opening of at least 5 Angstroms, a constraint index within the range of 1 to 12 and a silica to alumina ratio of at least 12 under temperature conditions within the range of 550° to 770° F and a hydrogen pressure within the range of 200 to 400 psia,

separating the product of said crystalline zeolite conversion operation in a high pressure separation zone at a temperature selected to provide a hydrogen containing gaseous product stream separately from a higher boiling product fraction,



separating the higher boiling product fraction of said conversion operation under lower pressure conditions to provide a gasoline product of said conversion operation separate from material boiling above said gasoline product,

further separating said material higher boiling than said gasoline product into a medium fuel oil product and a heavy diesel oil product fraction, and

cascading hydrogen rich gases separated from said hydrogenated product effluent in said low temperature separation zone to said crystalline zeolite conversion operation as a major source of hydrogen therefor.

4,059,649

COOLING OF RECYCLE HYDROCARBON AND/OR ALKYLATE PRODUCT IN ISOPARAFFIN-OLEFIN ALKYLATION

Charles C. Chapman, and Paul D. Hann, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Aug. 3, 1976, Ser. No. 711,185
Int. Cl.[2] C07C *3/54*
U.S. Cl. 260—683.48 **9 Claims**

1. An alkylation process which comprises:

a. reacting in a reaction zone at least one isoparaffin with at least one olefin in the presence of a sufficient amount of an acid catalyst at liquid phase reaction conditions for a period of time sufficient to form alkylate;

b. separating the reaction effluent to form a liquid acid phase and a liquid hydrocarbon phase;

c. maintaining conditions in the separation zone of step (b) to retain the hydrocarbon phase in the liquid state;

d. pressurizing at least a portion of the liquid hydrocarbon phase from said separation zone to produce a pressurized liquid hydrocarbon stream;

e. vaporizing a portion of the pressurized liquid hydrocarbon stream by reducing the pressure on said pressurized liquid hydrocarbon stream;

f. maintaining a pressure on said vaporized hydrocarbons sufficient to permit the entry of vaporous hydrocarbons into a fractionating zone;

g. subjecting hydrocarbons entering said fractionating zone to fractionating conditions and withdrawing a fractionator overhead comprising a mixture of paraffin and said acid catalyst, an intermediate cut comprising unreacted isoparraffin stream and a bottoms streams comprising essentially alkylate;

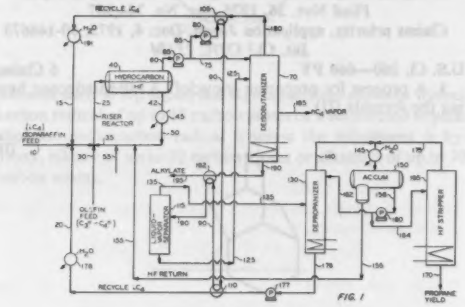


FIG. 1

h. recycling said isoparaffin stream to the reaction zone; and

i. utilizing said pressurized liquid hydrocarbon stream produced in step (e) to cool at least one of said bottoms stream, and said unreacted isoparaffin stream.

4,059,650

ANTI-DRIP ADDITIVE SYSTEM FOR FIRE RETARDANT POLYPROPYLENE

Francis J. Slama, Aurora, and Ivor R. Fielding, Naperville, both of Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed Jan. 27, 1976, Ser. No. 652,879
Int. Cl.[2] C08L *51/00, 63/00*
U.S. Cl. 260—837 R **9 Claims**

1. A composition comprising;

a. a resinous polymer of propylene comprising an alpha, beta-ethylenically unsaturated carboxylic acid modified resinous polymer of propylene; and

b. polyfunctional cross-linker containing vicinal polyepoxides wherein said polyfunctional cross-linker is present in a concentration of 0.5 to 15 parts by weight cross-linker per 100 parts by weight resinous polymer of propylene.

4,059,651

CURABLE BLENDS OF EPDM AND POLYPROPYLENE

William S. Smith, Jr., Freehold, N.J., assignor to Exxon Research & Engineering Co., Linden, N.J.

Continuation of Ser. No. 18,699, March 11, 1970, abandoned.
This application July 14, 1975, Ser. No. 595,709
Int. Cl.[2] C08L *19/00, 61/14*
U.S. Cl. 260—848 **5 Claims**

1. A molded article exhibiting improved impact resistance in the cured state, said article being prepared from a polymer blend consisting essentially of:

a. 2 to 30% by weight of a cross-linkable EPDM elastomer wherein the diene component of said EPDM is ethylidene norbornene and said EPDM containing 1 to 20 parts per hundred of a bromomethyl alkylated phenol aldehyde resin as a cross-linking agent to effect curing of said elastomer; and

b. 70 to 98% by weight of a stereoregular polypropylene, said polypropylene being an uncurable component, said elastomer being blended with polypropylene at a temperature above the melting point of the polypropylene, and

said cross-linkable EPDM being completely cured by said resin when said blend is subjected to molding temperatures of 350° to 650° F.

4,059,652

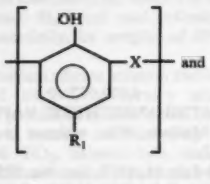
EXTRACTION RESISTANT POLYOLEFIN STABILIZER

John Leslie Hugh Allan, Glen Rock, N.J., and John James Roderick, Avon Lake, Ohio, assignors to Dart Industries Inc., Los Angeles, Calif.

Filed Apr. 15, 1976, Ser. No. 677,105
Int. Cl.[2] C08G *8/02, 8/18, 75/16*
U.S. Cl. 260—848 14 Claims

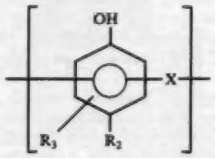
1. An extraction resistant polymer composition which comprises:

a major proportion of the recurring groups A of the formula



and

a minor proportion of the recurring groups B of the formula



wherein

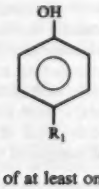
X can be

- S - or --S_2-;

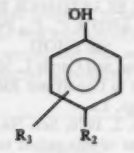
and wherein

R_1 and R_2 is a branched alkyl, cycloalkyl, alkaryl or an aryl group of 3 to 20 carbon atoms, R_3 is a sulfonic acid group - SO_3H or a salt thereof, R_4 and R_5 is hydrogen, or an alkyl, cycloalkyl, alkaryl or an aryl group of 1 to 20 carbon atoms; which polymer composition is prepared by reacting under acidic conditions

A. a mixture of a major proportion of at least one phenol of the formula



and a minor proportion of at least one phenol of the formula



B. with at least about 0.7 moles of a compound selected from the group consisting of aldehydes, ketones, sulfur monochloride and sulfur dichloride per mole of total phenols in the mixture of A.

9. A 2–8 carbon atom α - olefin polymer containing from about 0.01 to about 5 percent by weight of the polymer of claim 1.

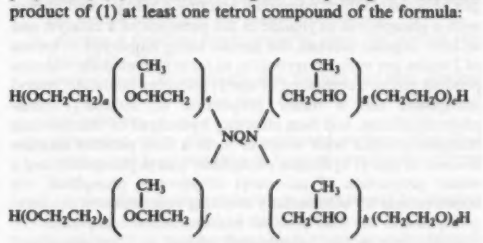
4,059,653

ANTISTATIC DYEABLE POLYAMIDE COMPOSITION

Ronald D. Mathis, Taylors, and James S. Dix, Greenville, both of S.C., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed May 27, 1976, Ser. No. 690,806
Int. Cl.[2] C08L *77/00*
U.S. Cl. 260—857 PG 36 Claims

1. A polyamide composition prepared by admixing (A) a polyamide; (B) an antistatic agent comprising the reaction product of (1) at least one tetrol compound of the formula:



where *a, b, c, d, e, f, g,* and *h* are each a whole number and the total of *a, b, c,* and *d* is between 8 and 1,000 and the total of *e, f, g,* and *h* is between 8 and 850, Q is an alkylene radical containing 1 to 13 carbon atoms, wherein the molecular weight of said tetrol compound is between about 1,650 and about 135,000 and said (OCH_2CH_2) moieties make up from about 10 to about 90 weight percent of said tetrol compound, and (2) at least one dicarboxylic acid ester having the formula R'OOC—A—COOR' wherein A is a valence bond or a divalent hydrocarbyl radical having from 1 to 8 carbon atoms and R' is an alkyl group containing 1 to 4 carbon atoms or a hydroxyalkyl group containing 2 to 4 carbon atoms, wherein the two R' radicals may be the same or different; and (C) at least one zinc alkyl sulfinate of the formula:

$$Zn(R''SO_2)_2$$

wherein R'' is an alkyl group containing from 4 to 20 carbon atoms; wherein the amount of antistatic agent is that which is sufficient to improve the antistatic characteristics of said polyamide and the amount of zinc alkyl sulfinate is such that when said polyamide composition is dyed with an acid dye, the K/S value will be greater than that which would be observed if the zinc alkyl sulfinate were not present in said polyamide composition.

4,059,654

THERMOPLASTIC ELASTOMER BLEND OF EPDM, POLYETHYLENE, AND A C_3–C_{16} POLYOLEFIN AND METHOD

George A. Von Bodungen, and Curtis L. Meredith, both of Baton Rouge, La., assignors to Copolymer Rubber & Chemical Corporation, Baton Rouge, La.

Filed Nov. 2, 1976, Ser. No. 738,027
The portion of the term of this patent subsequent to May 18, 1993, has been disclaimed.
Int. Cl.² C08L 23/16
U.S. Cl. 260—897 A 26 Claims

1. A thermoplastic elastomer formed of (1) an EPDM interpolymer of ethylene, a monoolefin containing from 3–16 carbon atoms, and a polyene, (2) a polymer of a monoolefin monomer containing 3–16 carbon atoms, and (3) polyethylene in which the polyethylene is present in an amount greater than 15% but not more than 25% by weight, with the remainder of 70% to less than 85% by weight divided between the EPDM interpolymer and the monoolefin polymer in the ratio of 90–10 parts by weight of EPDM polymers to 10–90 parts by weight of monoolefin polymers, said components in admixture being subjected to free radical reaction during hot working in the presence of a free radical generating catalyst.

4,059,655

PROCESS FOR PREPARING HALOGENATED DIARYL HYDROGEN PHOSPHATES

John C. Crano, Akron, Ohio, assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Nov. 24, 1975, Ser. No. 634,690
Int. Cl.² C07F 9/09
U.S. Cl. 260—983 6 Claims

1. In the method for preparing a halogenated diaryl hydrogen phosphate which comprises reacting a halogenated phenol with a phosphorus oxyhalide in the presence of a catalyst and an inert organic solvent, the phenol being employed in excess of 2 moles per mole of oxyhalide, to form intermediate reaction product mixture consisting of diaryl phosphorohalidate, triaryl phosphate, and a minor proportion of monoaryl phosphorodihalidate, and then effecting hydrolysis of intermediate reaction product with water to form a final product mixture mixture of diaryl hydrogen phosphate, triaryl phosphate, and a minor proportion of monoaryl dihydrogen phosphate, the improvement for substantially avoiding coproduction of triaryl phosphate in the final product mixture which comprises:

employing as the halogenated phenol a 2,6-dihalophenol having the halogens in its 2 and 6 ring positions selected independently from the group consisting of bromine and iodine, and

effecting the hydrolysis in the presence of inert organic hydrolysis solvent at a pH between about 1 and 9 and a temperature between about 20° and 100° C. for a time between about 15 minutes and 18 hours to form bis(2,6-dihalophenyl) hydrogen phosphate having in admixture therewith only a minor proportion of tris(2,6-dihalophenyl)phosphate and 2,6-dihalophenyl dihydrogen phosphate.

4,059,656

PROCESSES FOR NEUTRALIZING 2,3-DIBROMOPROPANOL PHOSPHORIC ACID ESTERS CONTAINED IN TRIS(2,3-DIBROMO-1-PROPYL) PHOSPHATE

Michel Demarcq, Lyon, France, assignor to Produits Chimiques Ugine Kuhlmann, Paris, France

Filed Apr. 2, 1976, Ser. No. 672,988
Claims priority, application France, Apr. 25, 1975, 75.2982
Int. Cl.² C07F 9/09
U.S. Cl. 260—990 9 Claims

1. A process for neutralizing tris(2,3-dibromo-1-propyl) phosphate containing phosphoric acid acid esters of dibromopropanol alone or with hydrohalic acidity, which comprises heating the phosphate with at least one carbon-containing orthoester having the formula

$$Z—C(OY)_3$$

where Z is a hydrogen atom, a methyl or phenyl radical or an OY group and Y is a saturated aliphatic radical containing up to five carbon atoms or a 2,3-dibromo-1-propyl group.

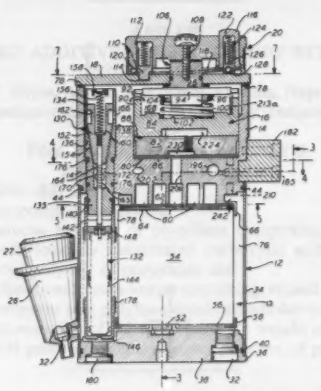
9. A dibromopropyl phosphate prepared according to claim 1, the phosphate containing a quantity of the mixed phosphoric acid esters of 2,3-dibromo-1-propanol or of an alcohol having from formula YOH resulting from neutralization of said tris (2,3-dibromo-1-propyl) phosphate containing the acid esters and acidity.

4,059,657

CALIBRATED ANESTHETIC VAPORIZER

Wayne W. Hay, Madison, Wis., assignor to Airco, Inc., New Providence, N.J.

Filed July 11, 1975, Ser. No. 595,186
Int. Cl.² A61M 15/00, 17/00
U.S. Cl. 261—104 12 Claims



12. An anesthetic vaporizer comprising a housing forming a vaporizing chamber containing liquid anesthetic and a liquid absorbing wick assembly extending into the liquid, a control valve assembly with gas inlet and outlet passages respectively, mounted on the housing to proportion the flow of inlet gas through, respectively, one path including the vaporizing chamber, and another path constituting a bypass passage to the outlet passage, the chamber having inlet and outlet passages extending vertically along opposite sides of the chamber respectively, the wick assembly comprising a stack of alternating planar and corrugated sheets forming a plurality of parallel passages extending horizontally across the chamber throughout its height, the stack substantially filling the chamber, and the horizontal passages connecting at opposite edges of the stack with the chamber inlet and outlet vertical passages respectively, the planar sheets, at each side of a corrugated sheet, are formed by a lamina comprised of a planar sheet of thermally conductive material interposed between planar sheets of absorbent material.

4,059,658

LOW TEMPERATURE PRODUCTION OF HIGH PURITY FUSED SILICA

Robert D. Shoup, Painted Post, and William J. Wein, Lowman, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Sept. 15, 1975, Ser. No. 613,202
Int. Cl.² C04B 35/14
U.S. Cl. 264—43 4 Claims

1. A method for producing a solid, homogeneous, transparent fused silica article having an alkali metal content less than about 100 PPM which comprises:

a. preparing solutions having a pH between about 11–15 and containing about 1–12 moles SiO_2/liter in solution from silicate solutions selected from the group consisting of potassium silicate, sodium silicate, quaternary ammonium silicate, lithium polysilicate, and colloidal silica;

b. combining those solutions in one of the indicated proper proportions in weight percent equivalent to:

A. 50–90% potassium silicate solution and 10–50% colloidal silica solution wherein said potassium silicate solution consists essentially, by weight, of 8.3% K_2O, 20.8% SiO_2, balance H_2O and said colloidal silica solution consists essentially, by weight, of 40% SiO_2, balance H_2O;

B. 50–90% potassium silicate solution and/or sodium silicate solution and 10–50% quaternary ammonium silicate wherein said potassium silicate is that defined in (A), said sodium silicate consists essentially, by weight, of 6.8% Na_2O, 25.3% SiO_2, balance h_2O, and said quaternary ammonium silicate solution consists essentially, by weight, of 9.9% quaternary ammonium ions, 45% SiO_2, balance H_2O;

C. 50–90% potassium silicate solution and/or sodium silicate solution and 10–50% lithium polysilicate solution wherein said potassium silicate solution is that defined in (A), said sodium silicate solution is that defined in (B), and said lithium polysilicate solution consists essentially, by weight, of 2.1% Li_2O, 20% SiO_2, balance H_2O;

c. reacting an organic compound therewith selected from the group consisting of formaldehyde, paraformaldehyde, formamide, glyoxal, methyl formate, methyl acetate, ethyl formate, ethyl acetate, and mixtures thereof at a temperature between the freezing point and the boiling point of the solution for a sufficient length of time to reduce the pH of the silicate solution below about 11 and to polymerize the silica into a coherent, porous gelled body;

d. leaching said gelled body with a weak acid solution having a pH greater than about 4 to reduce the pH to at least below 6 to thereby yield a porosity of at least 50% with meon pore diameters ranging between 400A to 4000A and wherein at least 80% of the pores fall within ±30% of the average pore diameter;

e. consolidating said porous body into a solid, transparent body by firing at temperatures between about 1350°–1500° C.

4,059,659

PROCESS FOR PRODUCING FINISHED AND/OR IRREVERSIBLY EMBOSSED MICROPOROUS SHEET STRUCTURES

Karl Heinz Hilterhaus, Georgsmarienhutte, Oesede, Germany, assignor to Chemie-Anlagenbau Bischofsheim GmbH and Reuter Technologie GmbH, both of, Germany

Filed Oct. 22, 1975, Ser. No. 624,892
Int. Cl.² B29D 27/04; B32B 3/30, 31/12
U.S. Cl. 264—45.3 18 Claims

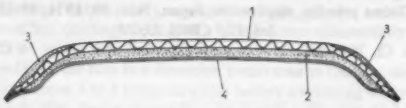
1. In a method of producing microporous sheet structure having the appearance of artificial leather by coagulation of a polyurethane solution in which a coagulatable polyurethane solution is coagulated, washed, and dried, and in which a finishing agent for making artificial leather is utilized for making a leather appearance, the improvement wherein the polyurethane solution is spread out flat such that it has a free upper surface and wherein said finishing agent for making artificial leather is applied to the free surface of the polyurethane solution which has been spread out flat and before coagulation thereof to achieve a leather appearance without a subsequent finishing step.

4,059,660

METHOD OF MOLDING A LIGHT-WEIGHT PANEL

Jacques Roth, Strasbourg; Michel Roth, Ostwald; Paul Seiler, Illkirch-Graffenstaden; Roger Lavenir, Strasbourg, and Alain Manigold, Strasbourg-Koenigshoffen, all of France, assignors to Roth Freres, S.A., Strasbourg-Meinau, France

Filed Jan. 21, 1976, Ser. No. 650,983
Claims priority, application France, Feb. 5, 1975, 75.05064; Dec. 22, 1975, 75.40180
Int. Cl.² B29D 27/00
U.S. Cl. 264—46.4 7 Claims



1. A method of manufacturing a moulded panel, characterised in that it comprises the steps of:

i. wetting one of the surfaces of a sheet of cardboard with a solution of polymerisable urethane elastomer,

ii. wetting one of the surfaces of a sheet of cured polyurethane foam with a solution of polymerisable urethane elastomer,

iii. placing the non-wetted surface of the sheet of foam upon the wetted surface of the sheet of cardboard,

iv. placing a finishing cover material upon the wetted surface of the foam,

v. turning over the sandwich thus formed and then wetting the virgin surface of the sheet of cardboard with more of said solution,

vi. disposing upon this last-mentioned surface after thus wetting it at least one strip or layer of cured polyurethane foam,

vii. placing the resulting assemblage into a mould for shaping the assemblage into a panel of the desired form, and

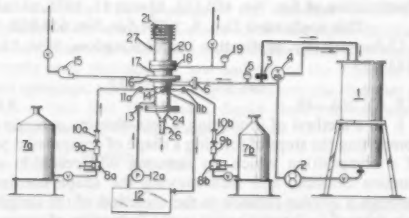
viii. polymerising said urethane elastomer at least far enough to ensure that the panel will retain the said desired form and then removing the panel from the mould.

4,059,661

MANUFACTURE OF POLYVINYL CHLORIDE FOAMS

Herbert Eck; Gunter Weinhold, and Manfred Hannebaum, all of Burghausen, Germany, assignors to Wacker-Chemie GmbH, Munich, Germany

Filed Mar. 6, 1975, Ser. No. 555,712
Claims priority, application Germany, Mar. 6, 1974, 2410752
Int. Cl.² B29D 27/00
U.S. Cl. 264—54 15 Claims



1. A process for producing a soft polyvinyl chloride foam

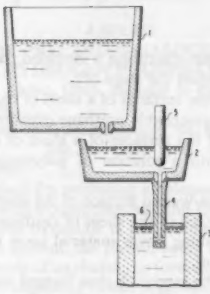
which comprises feeding a foamable soft polyvinyl chloride plastisol to a high speed mixing zone, agitating said foamable soft polyvinyl chloride plastisol at high speed in said high speed mixing zone at a pressure not exceeding about 15 atmospheres gauge to thereby generate, by friction, at least about 60 percent of the heat necessary for foaming and gelatination of said plastisol and cause foaming and gelling of said plastisol within said mixing zone, and discharging an at least partially gelled and at least partially foamed polyvinyl chloride from said mixing zone.

4,059,662

METHOD OF MAKING IMMERSION NOZZLE AND LONG STOPPER FOR CONTINUOUS CASTING OF STEEL

Kazumasa Murakami, Nagoya, and Takashi Natori, Osaka, both of Japan, assignors to Nippon Crucible Co., Ltd., Tokyo, Japan

Filed Dec. 1, 1975, Ser. No. 636,461
Claims priority, application Japan, Nov. 30, 1974, 49-138739
Int. Cl.² C04B *33/34*
U.S. Cl. 264—62 **6 Claims**



1. A method of making an immersion nozzle or a long stopper, which consists essentially of 3 to 15% by weight of a binder capable of forming a carbon bond upon burning to decompose the binder in a reducing atmosphere, 48 to 82% by weight of zircon sand, 10 to 35% by weight of natural flake graphite and 1 to 8% of silicon containing at least 90% silicon and having a particle diameter of not more than 74 microns, said process comprising the steps of kneading the binder with the zircon sand, graphite and silicon, molding the kneaded mixture in an isostatic press at a pressure of 500 to 1500 kg/cm², burning the molded product in a reducing atmosphere at a temperature of 900° to 1200 ° C and applying a glassy coating to the outer surface of the burned product.

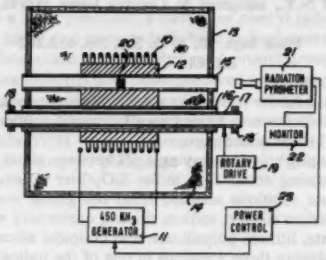
4,059,663

PRODUCTION OF BETA-ALUMINA CERAMIC ARTICLES AND FURNACE THEREFOR

Lyndon James Miles, and Ivor Wynn Jones, both of Chester, England, assignors to The Electricity Council, London, England

Continuation of Ser. No. 450,111, March 11, 1974, abandoned. This application Dec. 8, 1975, Ser. No. 638,868
Claims priority, application United Kingdom, Mar. 12, 1973, 11835/73
Int. Cl.² C04B *33/32*
U.S. Cl. 264—65 **9 Claims**

1. In a method of producing a beta-alumina ceramic article comprising the steps of forming a shape of compressed powder of a composition which on sintering will result in a beta-alumina ceramic, and then moving the shape continuously through a tubular furnace in the direction of the longitudinal axis thereof to thereby result in the formation of water vapor and a stable atmosphere of sodium oxide vapor and in order to sinter said powder, the improvement comprising simultaneously causing an air flow through the tubular furnace in the direction of movement of the shape at a speed not less than the speed of movement of the shape while moving said shape



through said furnace, said air flow being sufficient to carry said water vapor through said furnace but not so great that said sodium oxide is carried through said furnace faster than said sodium oxide is formed.

4,059,664

METHOD OF MANUFACTURING FERRIMAGNETIC MATERIAL FOR RECORDING, READ OUT AND ERASE HEADS UTILIZED IN MAGNETIC LAYER DEVICES

Jean Nicolas; Alain Lagrange, and Mieczyslaw Hildebrandt, all of Paris, France, assignors to Thomson-CSF, Paris, France

Continuation of Ser. No. 313,339, Dec. 8, 1972, abandoned. This application July 2, 1975, Ser. No. 592,657
Claims priority, application France, Dec. 14, 1971, 71.44897
Int. Cl.² C04B *35/30*
U.S. Cl. 264—66 **8 Claims**

1. A method of manufacturing a polycrystalline, spinelle structure ferrimagnetic material, the overall chemical composition of which satisfies the general formula:

$$Ni_{1-x}Zn_xFe_{2(1+e)}O_4$$

where

$0.50 \leqq x \leqq 0.70$ **and**

$-0.08 \leqq e \leqq +0.015$

exhibiting a porosity coefficient at most 1%, the microscopic structure thereof composed of grains having a mean diameter not in excess of 5 microns, comprising the following stages:

mixing zinc, nickel and iron oxides having a purity of better than 99% in order to obtain proportions of metal atoms and oxygen, as indicated by the gross formula:

$$Ni_{1-x}Zn_xFe_{2(1-e)}O_4$$

where x ranges between 0.50 and 0.70 and "*a*" between 0.01 and 0.015 account being taken of the known firing losses occurring during the later heat treatments; crushing in steel vessels using steel balls and distilled water, for around 24 hours; firing at a temperature ranging between 900° C and 1200° C, and further crushing in steel vessels using steel balls and distilled water, for around 48 hours; drying the mixture thus obtained; mixing the powder obtained, with an organic binder; obtaining a granulate from said mixture; pressing said granulate in suitably shaped moulds; heat treating to eliminate the binder; sintering at a temperature of about 1100° C to about 1200° C, at a pressure from 0.5 to 1 ton/cm², and for a period of time from about 15 to 300 minutes, the time of application of sintering pressure being related to sintering temperature according to FIG. 5.

4,059,665

BONDED NON-WOVEN FABRIC AND METHOD FOR MAKING IT

Louis E. Kelley, Philadelphia, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 36,499, May 11, 1970, abandoned. This application May 14, 1973, Ser. No. 360,285
Int. Cl.[2] D04H *1/64*
U.S. Cl. 264—128 2 Claims

1. A process of making a non-woven fabric which comprises associating in random array, within a web or mat, a mass of fibers, bringing into contact with the fibers a binder comprising an aqueous dispersion of the mixture of

1. a water-insoluble emulsion compolymer consisting essentially of 1 to 8% by weight of an N-methylolamide selected from N-methylolacrylamide or N-methylolmethacrylamide, and for the balance to make 100%, at least one ester of acrylic acid or methacrylic acid and a C_1 to C_{18} alkanol and 0.5 to about 5% by weight, based on the copolymer weight, of an unsaturated aliphatic carboxylic acid having 3 to 6 carbon atoms and
2. about 0.5 to about 10% by weight, based on the weight of the copolymer of a polyalkylene glycol of the formula

$$HO—(RO)_n—H$$

wherein R is an alkylene group of 2 to 6 carbon atoms and *n* is a number having an average value of 4 to 50, drying the resulting fibrous mass to effect fusion of the polymer and bonding of the fibers, and then heating the fibrous product at a temperature of 210° F. to 750° F. to produce a soft, resillient nonwoven fibrous product of excellent solvent resistant properties.

4,059,666

METHOD OF CONVERTING OIL AND WASTE CONTAINING SLUDGE TO DRY WASTE

Leslie L. Fowler, 1722 E. 59 St., Tulsa, Okla. 74105

Continuation of Ser. No. 408,671, Oct. 23, 1973, abandoned. This application Apr. 17, 1975, Ser. No. 568,778
Int. Cl.[2] B29C *25/00*
U.S. Cl. 264—129 1 Claim

1. The method of converting oil and water containing sludge to dry waste comprising the steps of:

1. adding to the sludge petrophylic material selected from the group consisting of waste roofing felt and polyurethane fibers, in an amount sufficient to absorb the oily component of the sludge material;
2. adding to the mixture of sludge and petrophylic material fibrous material selected from the group consisting of fiberglass wastes, chopped glass fibers, Spanish moss, hay, straw and cornstalks in an amount sufficient to strengthen and bond the particles of petrophylic material;
3. allowing the entrained water to drain from the mixture as the oil components of the sludge are absorbed in the petrophylic material;
4. adding to the mixture a hydrophylic material selected from the group consisting of volcanic ash and bentonite in an amount sufficient to absorb and bond the remaining water in the mixture;
5. forming the mixture into suitably sized volumes or packages; and
6. coating the external surface of said packages with an air drying liquid selected from the group consisting of sodium silicate, and asphalt tar to form a water impervious layer thereon.

4,059,667

BIAXIALLY ORIENTED POLYETHYLENE TEREPHTHALATE FILM AND METHOD OF MAKING SUCH FILM

William James Pangonis, West Chester, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 20, 1975, Ser. No. 624,256
Int. Cl.[2] B29D *7/24, 7/00*
U.S. Cl. 264—289 6 Claims

1. A method of making biaxially oriented polyethylene terephthalate film including the steps of:

stretching amorphous polyethylene terephthalate film in a first direction about 1.2 to 2 times its initial length at a first temperature slightly above the glass transition temperature of the film to provide molecular orientation in that direction;

heating the thus oriented film to a temperature slightly higher than such first temperature for a time sufficient to partially remove such orientation while maintaining the film in a substantially amorphous state; and

thereafter, cooling the film to a temperature substantially the same as the first temperature and

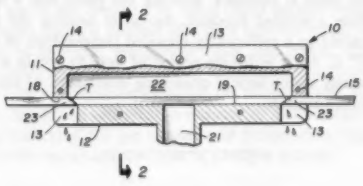
stretching the film in a direction transverse to the first direction about 3 to 4 times its width before stretching whereby such film has a shrinkage, on heating to 100° C for 5 seconds, of less than 8% in the first direction and greater than 40% transverse to the first direction.

4,059,668

METHOD OF STRETCHING A TOW

David F. Bittle, Decatur, Ala., and Arnold L. McPeters, Raleigh, N.C., assignors to Monsanto Company, Decatur, Ala.

Continuation-in-part of Ser. No. 415,485, Nov. 13, 1973, abandoned, which is a continuation-in-part of Ser. No. 244,195, April 14, 1972, abandoned, which is a continuation-in-part of Ser. No. 50,485, June 29, 1970, abandoned. This application May 2, 1975, Ser. No. 574,062
Int. Cl.[2] B29C *17/02*
U.S. Cl. 264—290 R 10 Claims



1. The method of stretching a tow of filaments selected from the group consisting of acrylic, modacrylic, nylon, polyester, rayon and polyvinyl chloride comprising:

a. advancing the tow into a chamber at a first speed, said chamber having an opening at each end thereof for the passage of tow into and out of the chamber and for the passage of a heated liquid out of the chamber.

b. forcing a stream of heated liquid into the chamber at a point between the openings in the chamber to fill the chamber with heated liquid and force said liquid through the tow from one side thereof to the other and, then transversely back through the tow and out of the chamber at said openings, said liquid being forced into the chamber at such a rate that the heated liquid flow rate outward through each of the openings is at least

$$x = 3{,}000T\sqrt{(WN/h)}\,(\mu/\rho)$$

where x is the flow rate through each openings in gallons per minute, T is the thickness in inches of the stream of heated liquid flowing through each opening, W is the width in inches of each liquid stream and the tow passing

through the openings, h is the thickness in inches of the tow passing through said openings, N is the number of filaments in the tow, μ is the viscosity of the heated liquid in pounds per foot-second and ρ is the density of the heated liquid in pounds per cubic foot, the dimensions W and h defining an area that the cross section of the tow is free to assume at the openings, the dimensions W and T defining an area WT which is the cross sectional area that the stream of liquid is free to assume at said openings, and

c. withdrawing the tow from the chamber at a second speed greater than the first so that the filaments are stretched.

4,059,669

METHOD OF MAKING ALUMINUM PHOSPHATE

Ian M. Thomas, Temperance, Mich., assignor to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 305,342, Nov. 10, 1972, abandoned. This application July 12, 1974, Ser. No. 488,087

Int. Cl.² C01B *15/16*

U.S. Cl. 264—319 **4 Claims**

1. A method for making a shaped article consisting essentially of aluminum metaphosphate comprising mixing in reactive proportions a phosphoric acid or a phosphorous acid with

1. an organic aluminum compound represented by the structural formula:

$$Al(OR)_3$$

wherein R is a member selected from the group consisting of straight and branched chain alkyl groups containing from 1 to 20 carbon atoms, phenyl and alkaryl groups containing from 7 to 12 carbon atoms, or

2. the hydrolysis product of $Al(OR)_3$ wherein R is defined above, forming a clear, liquid reaction product mixture, mixing the liquid reaction product mixture with dry finely divided aluminum metaphosphate until a smooth, pourable paste is obtained, pouring the paste into a mold to obtain a molded product, thereafter heating the molded product to a sufficiently elevated temperature of at least 100° C. for a sufficient period of time to obtain a dimensionally stable article consisting essentially of aluminum metaphosphate.

4,059,670

METHOD FOR SEPARATION AND ENRICHMENT OF ISOTOPES

Hidetake Kakihana, Tokyo, and Tokuhisa Miyamatsu, Nagoya, both of Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Filed Dec. 3, 1975, Ser. No. 637,112

Claims priority, application Japan, Dec. 9, 1974, 49-141354

Int. Cl.² C01G *56/00, 43/00*

U.S. Cl. 423—7 **9 Claims**

1. A method for separation and enrichment of isotopes, which comprises

loading a solution containing anions of a mixture of isotopes of an element selected from the group consisting of boron and uranium into weakly basic anion exchange fibers which have a diameter of not more than 100 μm, a length of not more than 5 mm, an aspect ratio of at least 5 and an exchange capacity of at least 2 meg/g-dry fiber, and which are packed with a specific volume of 2.0 – 20.0 ml/g-dry fiber and

then eluting said anions with an eluting agent at a temperature of 0°–100° C.

4,059,671

METHOD FOR INCREASING THE LIFETIME OF AN EXTRACTION MEDIUM USED FOR REPROCESSING SPENT NUCLEAR FUEL AND/OR BREEDER MATERIALS

Helmut Schmieder, Karlsruhe, and Ludwig Stieglitz, Graben-Neudorf, both of Germany, assignors to Gesellschaft fur Kernforschung m.b.H., Karlsruhe, Germany

Filed Oct. 20, 1975, Ser. No. 624,107

Claims priority, application Germany, Oct. 18, 1974, 2449589

Int. Cl.² B01D *11/04*

U.S. Cl. 423—10 **7 Claims**

1. In a method for increasing the lifetime of an extraction medium containing an organophosphorus acid ester and a hydrocarbon, and being used for reprocessing spent nuclear fuel and/or breeder materials, by removing from the extraction medium impurities resulting from chemical and/or radiolytic decomposition and complex compounds of such impurities with radionuclides by washing the extraction medium with an aqueous wash solution, the improvement comprising bringing the extraction medium, after use, into intimate contact with an aqueous hydrazine hydrate wash solution having a concentration of between about 0.1 molar and 1.0 molar, at a temperature between about 20° C to about 75° C, and then separating the aqueous hydrazine hydrate wash solution from the extraction medium.

4,059,672

METHOD OF DIGESTING BAUXITE VIA THE BAYER PROCESS WITH THE ADDITION OF REDUCING AGENTS

Trevor Crombie Maitland Davis, Sidney, Canada, and James Ernest Laurie, Mandeville, Jamaica, assignors to Revere Copper and Brass Incorporated, New York, N.Y.

Filed Apr. 2, 1973, Ser. No. 346,736

Int. Cl.² C01F *7/06, 7/08*

U.S. Cl. 423—121 **1 Claim**

1. In the Bayer process for the separation of alumina from goethite-containing or alumo-goethite-containing bauxite by digestion with aqueous caustic soda, the improvement whereby the settling rate of the resulting suspended solids in the digested mixture is increased by the chemical conversion of a portion of the goethite to hematite and magnetite, said improvement comprising contacting the bauxite during the digestion at a temperature of between about 400° and 500° F. under superatmospheric pressure for a period of time of between about 20 and 40 minutes with a reducing agent capable of reducing at least a part of the trivalent iron in the goethite or alumogoethite to the divalent state under the digestion conditions and selected from the group consisting of sucrose and cellulose, said reducing agent being added to the digestion mixture in an amount of between about 1 and 2 percent by weight based on the weight of dry bauxite.

4,059,673

PRODUCTION OF BAUXITE AND ALUMINIUM CHLORIDE OF LOW IRON CONTENT

Robin David Holliday, Daytona Beach, Fla., and David John Milne, Highfields, Australia, assignors to Comalco Limited, Melbourne, Australia

Filed Apr. 10, 1975, Ser. No. 567,007

Claims priority, application Australia, Apr. 17, 1974, 7271

Int. Cl.² C01F *7/56;* C01G *49/10*

U.S. Cl. 423—136 **8 Claims**

1. Process for production of aluminum chloride of low iron content from aluminous materials containing iron, which comprises in a first step reacting an aluminous material containing iron at temperatures from 400° to 750° C with a gas mixture comprising 20 to 40% SO_2 by volume, the balance being CO apart from minor diluents, to produce iron sulphide; in a second step, heating the product of the first step in the presence of chlorine, whereby ferric chloride is produced and removed by

volatilization, whereby a purified aluminous material of low iron content is obtained; and in a third step, chlorinating said purified aluminous material with a chlorinating gas to produce aluminum chloride of low iron content.

6. Process for removing iron from bauxite which comprises
a. heating the bauxite raw material at temperatures not exceeding 750° C to remove entrained and combined water;
b. treating the product of step (a) at temperatures from 400° to 750° C with a gas mixture consisting essentially of 20 to 40% SO_2 and 80 to 60% CO by volume to sulphidize iron contained therein;
c. treating the product of step (b) at temperatures between 430° and 750° C with chlorine and removing the iron chloride so produced by volatilization.

4,059,674

METHOD FOR MANUFACTURING PHOSPHORIC ACID AND GYPSUM

Edwin B. Lopker, Fort Lauderdale, Fla., assignor to Pullman Incorporated, Chicago, Ill.

Filed July 18, 1972, Ser. No. 272,788
Int. Cl.[2] C01F *11/00*; C01B *25/16*; C01F *1/00*
U.S. Cl. 423—167 4 Claims

1. A method for producing phosphoric acid and high purity gypsum comprising:
a. introducing calcium phosphate rock, phosphoric acid and sulfuric acid into a reaction system;
b. reacting in said reaction system substantially all of said calcium phosphate rock to form a first slurry of phosphate-containing gypsum calcium sulfate in a first liquid comprising phosphoric acid having a concentration of at least 25 percent;
c. withdrawing a portion of said first slurry from said reaction system and separating phosphoric acid product having a concentration of at least 25 percent therefrom;
d. recrystallizing phosphate-containing gypsum calcium sulfate contained in the withdrawn portion in a second liquid comprising phosphoric acid having a concentration of less than about 10 percent and sulfuric acid to form a second slurry of calcium sulfate hemihydrate;
e. recrystallizing said calcium sulfate hemihydrate in a third liquid comprising phosphoric acid having a concentration of less than 10 percent to form a third slurry of high purity gypsum; and
f. separating said high purity gypsum as a product of the process.

4,059,675

DECOMPOSITION OF HALOGENATED ORGANIC COMPOUNDS

Kang Yang; James D. Reedy, and John F. Scamehorn, all of Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Continuation-in-part of Ser. No. 689,221, May 26, 1976, abandoned, which is a continuation-in-part of Ser. No. 613,159, Sept. 15, 1975, abandoned. This application June 14, 1976, Ser. No. 696,167
Int. Cl.[2] B01D *53/34*
U.S. Cl. 423—240 17 Claims

1. A method for decomposing chlorinated organic compounds, said chlorinated organic compounds containing 1 to 4 carbon atoms and containing at least as many hydrogen atoms as chlorine atoms, said method comprising:
a. heating the chlorinated organic compounds to a temperature above about 300° C., and
b. then contacting the heated organic compound with a catalytic amount of ruthenium in the presence of an oxidizing agent at a temperature of at least about 350° C.

4,059,676

DECOMPOSITION OF HALOGENATED ORGANIC COMPOUNDS

Kang Yang, and James D. Reedy, both of Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Continuation-in-part of Ser. No. 689,614, May 24, 1976, abandoned. This application June 14, 1976, Ser. No. 696,168
Int. Cl.[2] B01D *53/34*
U.S. Cl. 423—240 16 Claims

1. A method for decomposing chlorinated organic compounds, said chlorinated orgainc compounds containing 1 to 4 carbon atoms and containing at least as many hydrogen atoms as chlorine atoms, said method comprising:
a. heating the chlorinated organic compounds to a temperature above about 300° C., and
b. then contacting the heated organic compound with a catalytic amount of ruthenium-platinum catalyst in the presence of an oxidizing agent, selected from the group consisting of air, oxygen, and mixtures of nitrogen and oxygen, at a temperature of at least about 350° C., said catalysts being present in the range of 1 to 20 parts of platinum per part of ruthenium.

4,059,677

CATALYTIC OXIDATION OF C_2-C_4 HALOGENATED HYDROCARBONS

Edward J. Sare, Clinton, and Jerome M. Lavanish, Akron, both of Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Dec. 23, 1976, Ser. No. 753,951
Int. Cl.[2] B01D *53/34*
U.S. Cl. 423—240 23 Claims

1. A method for treating a C_2–C_4 halogenated hydrocarbon containing gas stream, said halogenated hydrocarbon being selected from the group consisting of chlorinated and brominated hydrocarbons, which comprises contacting the halogenated hydrocarbon with an oxidizing amount of oxygen-containing gas in the presence of metal oxide catalyst system, the metal oxide catalyst content of which consists essentially of a mixture of hydrated manganese oxide and cobalt oxide, the weight ratio of manganese oxide to cobalt oxide being from 19:1 to 1:19, at temperatures within the range of from 20° C., to 500° C., for a time sufficient to reduce the halogenated hydrocarbon content of the gas stream, said temperature being such as to inhibit water-induced loss of catalyst activity.

4,059,678

STABILIZATION OF IRON-CONTAINING ACIDIC HYDROGEN PEROXIDE SOLUTIONS

Donald Charles Winkley, Trenton, N.J., assignor to FMC Corporation, Philadelphia, Pa.

Filed Feb. 2, 1973, Ser. No. 328,987
Int. Cl.[2] C01B *15/2*
U.S. Cl. 423—273 7 Claims

1. In the process of using hydrogen peroxide in aqueous mineral acid compositions at a pH below 2.0, in which the acid is selected from the group consisting of sulfuric, nitric and phosphoric acids, and the composition is relatively free of halide, but contains dissolved ferric iron in amounts between 30 ppm and 30,000 ppm, the method of retarding the decomposition of the hydrogen peroxide induced by the iron which comprises precipitating almost all of the dissolved iron by contacting it with an amino(methyl phosphonic acid) in solution in the composition, using at least three phosphonic acid groups for each ferric iron ion present.

4,059,679
MODIFIED ZIRCONIUM PHOSPHATES

Abraham Clearfield, Athens, Ohio, assignor to Ohio University, Athens, Ohio

Continuation of Ser. No. 132,569, April 18, 1971, abandoned. This application Aug. 5, 1974, Ser. No. 494,579

Int. Cl.[2] C01B *15/16, 25/26;* **B01J** *27/14*

U.S. Cl. 423—306 **2 Claims**

1. A process for modifying the interlayer spacing of a crystalline zirconium phosphate hydrate, containing replaceable hydrogen ions, to produce a compound especially suitable for use as a catalyst, comprising the steps of reacting said phosphate with an alkali metal salt or hydroxide for a time sufficient for at least part of the hydrogen ions thereof to be replaced by said alkali metal, elevating the temperature of said cation-containing phosphate to at least partially dehydrate said alkali metal containing zirconium phosphate, and thereafter replacing said alkali metal with a dissimilar metal selected from the groups IB, IIA, IIIB, VIIB, and VIII of the periodic table of elements.

4,059,680
METHOD OF PREPARING FUMED SiO_2

Joel F. M. Leathers, Midland, Mich., and Donald W. Calvin, Zachary, La., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 660,294, Feb. 23, 1976, Pat. No. 4,008,130. This application Sept. 20, 1976, Ser. No. 724,683

Int. Cl.[2] C01B *33/12, 7/22*

U.S. Cl. 423—337 **4 Claims**

1. A method of preparing fumed SiO_2 and HF from the combustion of H_2SiF_6, said method comprising

providing an aqueous H_2SiF_6 feed stream,

embodying said aqueous H_2SiF_6 feed stream into a ternary azeotrope containing about 36% H_2SiF_6, about 10% HF, and about 54% H_2O, said embodying being done by providing the aqueous H_2SiF_6 with at least about 10 parts of HF and at least about 54 parts of H_2O per 36 parts of H_2SiF_6 and then distilling the so formed solution to obtain the ternary azeotrope,

feeding the ternary azeotrope into the combustion chamber of a burner in which a combustible mixture of fuel and oxygen is burned, thereby forming fumed SiO_2 and HF which leave the burner in the resulting hot, gaseous combustion product stream,

and separating fumed SiO_2 from the said product stream.

4,059,681
STABLE DRIED ALUMINUM HYDROXIDE GEL

Stanley L. Hem, West Lafayette, and Joe L. White, Lafayette, both of Ind., assignors to Purdue Research Foundation, Lafayette, Ind.

Continuation-in-part of Ser. No. 360,043, May 14, 1973, abandoned. This application Apr. 9, 1975, Ser. No. 566,254

The portion of the term of this patent subsequent to Oct. 7, 1992, has been disclaimed.

Int. Cl.[2] C01B *31/24;* **A01N** *11/00;* **A61K** *33/10;* **C01F** *7/02*

U.S. Cl. 423—419 P **4 Claims**

1. A process for drying an aqueous aluminum hydroxide gel to form a stable dried aluminum hydroxide gel meeting the United States Pharmacopeia, Eighteenth Revision specification, said process comprising: replacing the aqueous liquid in the aluminum hydroxide gel with a water miscible, non-aqueous solvent, said non-aqueous solvent being selected from a group consisting of lower alkanols having 1 to 5 carbon atoms, mixtures of lower alkanols having 1 to 5 carbon atoms and no more than 50% of benzene and toluene mixed therewith, and ketones having 2 to 4 carbon atoms; and drying the gel of aluminum hydroxide removing the non-aqueous solvent and producing a stable, acid-reactant dried amorphous powder

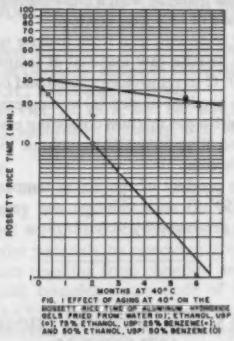


FIG. 1 EFFECT OF AGING AT 40° ON THE ROSSETT RICE TIME OF ALUMINUM HYDROXIDE GELS FRIED FROM WATER (0); ETHANOL, USP (4); 75% ETHANOL, USP: 25% BENZENE (+); AND 50% ETHANOL, USP: 50% BENZENE (0)

comprising not less than 50% and not more than about 56.8% of aluminum oxide.

4,059,682
METHOD OF MAKING SHAPED CARBONACEOUS BODIES

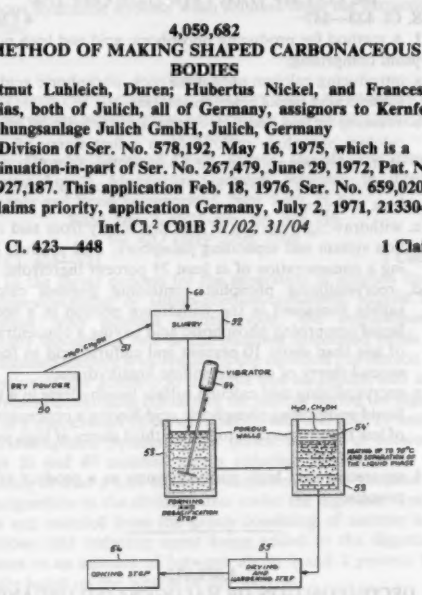
Hartmut Luhleich, Duren; Hubertus Nickel, and Francesco Dias, both of Julich, all of Germany, assignors to Kernforschungsanlage Julich GmbH, Julich, Germany

Division of Ser. No. 578,192, May 16, 1975, which is a continuation-in-part of Ser. No. 267,479, June 29, 1972, Pat. No. 3,927,187. This application Feb. 18, 1976, Ser. No. 659,020

Claims priority, application Germany, July 2, 1971, 2133044

Int. Cl.[2] C01B *31/02, 31/04*

U.S. Cl. 423—448 **1 Claim**



1. A method of making a graphitic body formed from filler particles consisting of petroleum coke, electrographite, natural graphite or carbon black, coated with binder selected from the group which consists of phenol-formaldehyde resins, pitch and tar, said method comprising the steps of:

a. producing a slurry of binder-coated filler particles by dissolving the binder first in methanol, a liquid in which the filler is slurried, and then introducing this slurry into water as a carrier liquid to produce an emulsion of the binder in the form of the coating upon the filler particles which settle and decanting the excess liquid;

b. shaping a mass of said binder-coated particles in a mold under vibrating and heating up for separation of the liquid phase;

c. thereafter drying the shaped mass of said binder-coated filler particles; and

d. cokefying the dried shaped mass.

4,059,683

DECOMPOSITION OF HALOGENATED ORGANIC COMPOUNDS

Robert C. Lindberg; James D. Reedy, and Kang Yang, all of Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Continuation-in-part of Ser. No. 679,429, April 22, 1976, abandoned. This application June 14, 1976, Ser. No. 696,169
Int. Cl.[2] C01B 7/08, 7/00
U.S. Cl. 423—481 12 Claims

1. A method for decomposing halogenated organic compounds said halogenated organic compounds containing 1 to 4 carbon atoms and containing at least as many hydrogen atoms as halogen atoms, said method comprising:

a. heating the halogenated organic compounds to a temperature in the range of above about 300° C. to about 500° C., and,

b. then contacting the heated organic compounds with a catalyst, which is platinum-impregnated on a nonoxidizing carrier, in the presence of an oxidizing agent and in the absence of added hydrocarbons at a temperature, which is at least 350° C. and is higher than the temperature of step (a),

said method being characterized further in that at least 99% of the halogen present in the halogenated organic compounds is converted to hydrogen halides.

4,059,684

BONE CEMENT COMPOSITIONS CONTAINING GENTAMYCIN

Albert Gross, Frankfurt am Main; Roland Schaefer, Friedrichsdorf, Taunus, and Siegfried Reiss, Bad Homburg, all of Germany, assignors to Kulzer & Co. GmbH, Bad Homburg, Germany

Filed Feb. 9, 1976, Ser. No. 656,668
Claims priority, application Germany, Mar. 14, 1975, 2511122
Int. Cl.[2] A61K 31/78
U.S. Cl. 424—4 13 Claims

1. A bone cement comprising the composition A or B, wherein:

A. comprises as the principal component a powdered copolymer of methyl methacrylate and methyl acrylate and 1.25 to 5 weight percent gentamycin in the form of the hydrochloride hydrobromide or 1.25 to 5 weight percent gentamycin in the form of the sulfate in admixture with 0.5 to 10 weight percent of sodium chloride, potassium chloride, sodium bromide or potassium bromide, and

B. comprises as the principal component monomeric methyl methacrylate and 2.5 to 10 weight percent gentamycin in the form of the hydrochloride hydrobromide or 2.5 to 10 weight percent of gentamycin in the form of the sulfate together with 1 to 20 weight percent of sodium chloride, potassium chloride, sodium bromide or potassium bromide.

4,059,685

IMMOBILIZED IMMUNOADSORBENT

Lavell R. Johnson, Salt Lake City, Utah, assignor to Summa Corporation, Culver City, Calif.

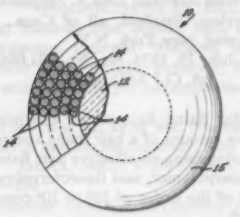
Filed Apr. 7, 1975, Ser. No. 565,848
Int. Cl.[2] G01N 31/00; G01T 1/00; G21C 17/00
U.S. Cl. 424—12 9 Claims

1. A reusable immobilized immunoadsorbent for use in radioimmunoassay wherein an antigen sample is flowed through said immunoadsorbent for binding a specific antigen thereto and for release of said antigen comprising:

a mass of superficially porous refractory particles;

each said particle of said mass including an impervious core having joined to the core sufficient layers of microparticles to form an outer porous coating on said core;

a water insoluble polymer material chemically bound by silane linkages to said superficially porous refractory particles; and



said polymer having bound thereto, by covalent bonds, antibodies for binding a specific antigen.

4,059,686

PHARMACEUTICAL PREPARATION FOR ORAL CAVITY ADMINISTRATION

Wataru Tanaka, Hoya; Eiichiro Akito, Omiya; Koichi Yoshida, Soka; Takashi Terada, Yono, and Hiroshi Ninomiya, Sayama, all of Japan, assignors to Nippon Kayaku Kabushiki Kaisha, Tokyo, Japan

Filed Sept. 22, 1975, Ser. No. 615,301
Claims priority, application Japan, Sept. 24, 1974, 49-108891
Int. Cl.[2] A61K 9/22, 31/78, 31/45, 9/26
U.S. Cl. 424—19 8 Claims

1. A pharmaceutical preparation for oral cavity administration comprising 10 to 60% by weight of sodium polyacrylate, 90 to 10% by weight of a pharmaceutical carrier selected from the group consisting of an excipient and ointment, and 50 to 0.05% by weight of a pharmacologically active agent.

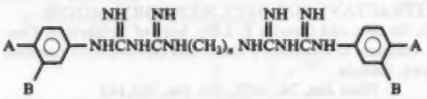
4,059,687

ESTER SUBSTITUTED DIBIGUANIDES AND NON-TOXIC ANTIMICROBIAL COMPOSITIONS THEREOF

Robert Andrew Bauman, New Brunswick, N.J., assignor to Colgate Palmolive Company, New York, N.Y.

Filed Nov. 26, 1976, Ser. No. 745,511
Int. Cl.[2] A01N 9/24; A61K 7/22; C07C 129/16
U.S. Cl. 424—54 9 Claims

1. A dibiguanide compound free of toxic substances having the structural formula:



wherein one of A and B is hydrogen and the other is the ester radical

and R is an alkyl group containing 1–8 carbon atoms and n is an integer from 5 to 12; and the acid salts thereof selected from the group consisting of HCl, HBr, HI, HF, H_2SO_4, CH_3COOH, gluconic acid, H_2PO_3F and H_3PO_4.

9. A non-toxic composition containing an effective antimicrobial amount of the compound defined in claim 1 admixed with an oral preparation.

4,059,688

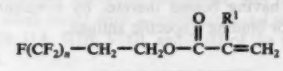
HAIR FIXING COMPOSITIONS CONTAINING FLUOROTERPOLYMERS AND METHOD

Ira E. Rosenberg, West Norwalk; John A. Ferguson, Darien, and Norman P. Loveless, Fairfield, all of Conn., assignors to Clairol Incorporated, New York, N.Y.

Filed June 29, 1976, Ser. No. 701,006
Int. Cl.[2] A61K 7/11
U.S. Cl. 424—71 18 Claims

1. A process for fixing hair which comprises applying thereto an effective amount of a hair fixing composition comprising a vehicle containing an effective hair fixing amount of at least one fluoroterpolymer; said fluoroterpolymer having a molecular weight of the order of 10^3 to 10^6 consisting essentially by weight of:

a. 60 to 85% of at least one ester of the formula:



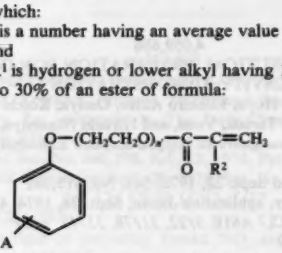
(I)

in which:

i. n is a number having an average value of from 3 to 20; and

ii. R^1 is hydrogen or lower alkyl having 1 to 4 carbons;

b. 10 to 30% of an ester of formula:



(II)

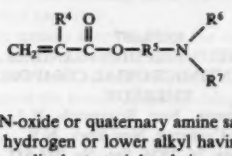
in which:

i. A is alkyl having 5 to 15 carbons;

ii. n' is a whole number having an average value of about from 20 to 45; and

iii. R^2 is hydrogen or lower alkyl having 1 to 4 carbons;

c. 2 to 10% of an amine ester of formula:



(III)

or the N-oxide or quaternary amine salt thereof in which:

i. R^4 is hydrogen or lower alkyl having 1 to 4 carbons;

ii. R^5 is a divalent straight chain or branched chain aliphatic hydrocarbon radical having 1 to 6 carbons; and

iii. R^6 and R^7 are lower alkyl having 1 to 4 carbons.

4,059,689

ATTRACTANT FOR BEET WEBWORM MOTHS

Dean L. Struble, and Charles E. Lilly, both of Lethbridge, Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Filed Jan. 24, 1977, Ser. No. 762,142
Claims priority, application Canada, Feb. 5, 1976, 245075
Int. Cl.[2] A01N 17/14
U.S. Cl. 424—84 4 Claims

1. A composite insect attractant for male moths of the beet webworm (*Loxostege sticticalis*) comprising

a. E-11-tetradecen-1-ol acetate and

b. a compound from the group dodecan-1-ol acetate, dodecan-1-ol, tetradecan-1-ol, E-11-tetradecen-1-ol and E-11-tetradecenal with (b) being present in small amounts enhancing the attractancy and species specificity of (a) to beet webworm moths, said amounts being from about 2 to about 10% by wt. of the mixture for the dodecyl compounds, and from about 10 to about 30% by wt. of the mixture for the tetradecyl compounds.

4,059,690

TOPICAL LIQUID OR OINTMENT

Walter Mont, 8655 N. Miami, Miami, Fla. 33150

Filed Feb. 2, 1977, Ser. No. 764,850
Int. Cl.[2] A61K 31/60, 31/045, 33/18
U.S. Cl. 424—150 2 Claims

1. A liquid to be applied topically comprising 90 parts by volume of tincture of iodides, 10 parts of menthol crystals liquefied in the tincture of iodides and 1 to 1½ parts of salicylic acid and 1½ parts of menthyl salicylate, said ingredients being thoroughly mixed to be topically applied.

4,059,691

METHOD OF REDUCING THE INCIDENCE OF INFECTIOUS DISEASES AND RELIEVING STRESS IN LIVESTOCK

John Wesley Willard, Sr., Rapid City, S. Dak., assignor to Caw Industries, Inc., Rapid City, S. Dak.

Continuation-in-part of Ser. No. 712,158, Aug. 6, 1976, Pat. No. 4,029,770, and Ser. No. 593,712, July 7, 1975, said Ser. No. 712,158, is a division of Ser. No. 455,022, March 26, 1974, Pat. No. 3,984,540, said Ser. No. 593,712, is a continuation-in-part of Ser. No. 317,097, Dec. 20, 1972, Pat. No. 3,893,943, which is a continuation of Ser. No. 108,198, Jan. 20, 1971, abandoned. This application Nov. 1, 1976, Ser. No. 737,513
Int. Cl.[2] A61K 33/12, 33/06, 33/00
U.S. Cl. 424—155 22 Claims

1. A method of reducing the incidence of infectious disease in livestock or relieving stress in livestock comprising providing the livestock with drinking water containing a catalytically effective amount of a catalyst, the said catalyst being prepared by a process comprising

admixing a water soluble alkali metal silicate with an aqueous medium containing a dissolved substance which is a source of calcium ion and a dissolved substance which is a source of magnesium ion,

the aqueous medium containing said dissolved substances in amounts to provide between about 1×10^{-4} and 1×10^{-1} mole per liter each of calcium ion and magnesium ion,

the aqueous medium containing said dissolved substances in amounts to provide a molar ratio of calcium ion to magnesium ion between about 2.0:1.0 and 1.0:2.0,

the alkali metal silicate having an alkali metal oxide to silicon dioxide ratio between about 0.9:1.0 and less than 2.0:1.0 and being admixed with the aqueous medium in an amount of about 0.05–2 moles per liter,

reacting the alkali metal silicate with said dissolved substances providing calcium ion and magnesium ion to produce an aqueous suspension of finely divided particles of the reaction product,

admixing a micelle-forming surfactant with the aqueous medium in an amount to form catalyst micelles comprising said finely divided particles upon agitating the aqueous medium, and

agitating the aqueous medium containing the finely divided particles and surfactant to form said catalyst micelles.

4,059,692

TREATING IMPAIRED CONSCIOUSNESS WITH GLUTAMYL-L-HISTIDYL-L-PROLINAMIDE

Yoshinao Takahashi, Kobe, and Kazuo Takeuchi, Tokyo, both of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Mar. 22, 1976, Ser. No. 669,455
Claims priority, application United Kingdom, Apr. 3, 1975, 13652/75; Nov. 26, 1975, 48557/75
Int. Cl.[2] A61K 37/00
U.S. Cl. 424—177 5 Claims

1. A method for the treatment of a human patient with impaired consciousness due to cranial trauma, brain surgery, cerebrovascular disorder, or brain tumor, which comprises

administering to such patient an effective amount of L-pyroglutamyl-L-histidyl-L-prolinamide or a physiologically acceptable salt thereof.

4,059,693

ANALGESIC ACTION OF SUBSTANCE P

John M. Stewart, Denver, Colo., assignor to University Patents, Inc., Stamford, Conn.

Filed June 11, 1976, Ser. No. 694,974
Int. Cl.[2] C07C *103/52;* A61K *37/00*
U.S. Cl. 424—177 4 Claims

1. Method for the production of analgesia in mammals requiring such therapy which comprises administering by injection an amount of effective to produce analgesia within the range of about 0.1 to about 50 micrograms per kg. of body weight of a compound selected from the group consisting of Substance P, and salts thereof of a pharmaceutically acceptable acid.

4,059,694

CARDIOTONIC AGENT

Ted R. Norton; Shoji Shibata, and Midori Kashiwagi, all of Honolulu, Hawaii, assignors to The University of Hawaii, Honolulu, Hawaii

Continuation-in-part of Ser. No. 683,446, May 5, 1976, abandoned. This application Aug. 2, 1976, Ser. No. 710,534
Int. Cl.[2] A61K *37/00;* C07C *103/52*
U.S. Cl. 424—177 8 Claims

1. A peptide according to claim 1 having the amino acid sequence: Gly-Val-Ser-Cys-Leu-Cys-Asp-Ser-Asp-Gly-Pro-Ser-Val-Arg-Gly-Asn-Thr-Leu-Ser-Gly-Thr-Leu-Trp-Leu-Tyr-Pro-Ser-Gly-Cys-Pro-Ser-Gly-Trp-His-Asn-Cys-Lys-Ala-His-Gly-Pro-Thr-Ile-Gly-Trp-Cy-Cys-Lys-Gln.

4,059,695

METHOD FOR MANUFACTURING A TONIC COMPOSITION FOR MAN AND OTHER ANIMALS

Kanari Hirosaki, and Shin Hirosaki, both of Miyazaki, Japan, assignors to Kanari Hirosaki, Japan

Continuation-in-part of Ser. No. 481,235, June 20, 1974, abandoned. This application Feb. 17, 1976, Ser. No. 658,813
Claims priority, application Japan, Feb. 14, 1974, 49-017112
Int. Cl.[2] A61K *31/78*
U.S. Cl. 424—195 26 Claims

1. A method for manufacturing a composition, comprising:

a. preparing wood vinegar by heating and cooling chips of wood and bark and then allowing said wood vinegar to stand at rest and separate into two layers, removing the supernatant layer, washing the supernatant with benzene and then distilling the washed supernatant thereby obtaining refined wood vinegar free of soluble tars unsuitable for ingestion by man or other animals;

b. immersing in said refined wood vinegar leaves of plants in an amount in the range of about 0.1 to 10 parts by weight per 100 parts of said refined wood vinegar, said leaves comprising:

85 — 100% by weight comfrey leaves
0 — 15% by weight bamboo leaves
0— 15% by weight garden radish leaves
0 — 15% by weight matrimony vine leaves

c. allowing said leaves to be permeated and fermented by said refined wood vinegar causing extracts from said leaves to be removed by said refined wood vinegar,

and d. filtering the refined wood vinegar containing said extracts thereby removing solid remains of said leaves and obtaining a composition.

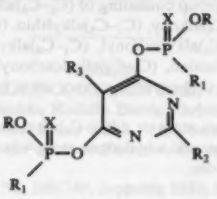
4,059,696

PYRIMIDINE (4,6)DIYL-BIS-(THIONO)(THIOL)-PHOSPHORIC(PHOSPHONIC)ACID ESTERS

Fritz Maurer; Hans-Jochem Riebel, both of Wuppertal; Ingeborg Hammann, Cologne; Wolfgang Behrenz, Overath-Steinenbrueck, and Bernhard Homeyer, Leverkusen, all of Germany , assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed May 11, 1976, Ser. No. 685,241
Claims priority, application Germany, May 27, 1975, 2523324
Int. Cl.[2] A01N *9/36;* C07F *9/65*
U.S. Cl. 424—200 10 Claims

1. A pyrimidine (4,6)diyl-bis-(thiono) (thiol)-phosphoric (phosphonic) acid ester of the formula



in which

R is alkyl with 1 to 6 carbon atoms,

R_1 is alkyl, alkoxy or alkylmercapto each with 1 to 6 carbon atoms or phenyl,

R_2 is alkyl, alkoxy or alkylmercapto each with 1 to 5 carbon atoms, hydrogen or phenyl,

R_3 is hydrogen, alkyl with 1 to 4 carbon atoms or halogen, and

X is oxygen or sulfur.

8. An insecticidal or acaricidal composition containing as active ingredient an insecticidally or acaricidally effective amount of a compound according to claim 1 in admixture with a diluent.

9. A method of combating insects or acarid pests which comprises applying to the pests or a habitat thereof an insecticidally or acaricidally effective amount of a compound according to claim 1.

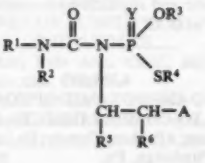
4,059,697

N-(SUBSTITUTED)AMINOCARBONYL O,S-DIALKYL PHOSPHORAMIDO(DI)THIOATES AND METHOD OF CONTROLLING ARTHROPODS

Janet Ollinger, North Wales, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Filed Mar. 1, 1976, Ser. No. 662,746
Int. Cl.[2] A01N *9/36;* C07F *9/24*
U.S. Cl. 424—211 16 Claims

1. A compound of the formula:



wherein

A is

a. a halogen atom,
b. a cyano group,
c. a (C_1–C_6)alkoxy group,
d. a (C_1–C_6)alkylthio group,
e. a (C_1–C_6)alkylcarbonyloxy group,
f. a phenoxy group, or

g. a phenylthio group;

R^1 is

a. a (C_1–C_{12})alkyl group,

b. a (C_3–C_8)cycloalkyl group,

c. an unsubstituted (C_7–C_{11})aralkyl group or a (C_7–C_{11})aralkyl group, the aryl portion of which is substituted with up to five substituents selected from the group consisting of (C_1–C_6)alkyl, (C_3–C_7)alkenyl, (C_1–C_6)alkoxy, (C_1–C_6)alkylthio, (C_1–C_6)alkylsulfinyl, (C_1–C_6)alkylsulfonyl, (C_1–C_6)alkylcarbonyl, di(C_1–C_3)alkylamino, (C_1–C_3)alkylcarbonylamino, (C_6–C_{10})aryl, (C_6–C_{10})aryloxy, (C_6–C_{10})arylthio, cyano, nitro, halogen and halomethyl,

d. an unsubstituted (C_6–C_{10})aryl group or a (C_6–C_{10})aryl group substituted with up to five substituents selected from the group consisting of (C_1–C_6)alkyl, (C_3–C_7)alkenyl, (C_1–C_6)alkoxy, (C_1–C_6)alkylthio, (C_1–C_6)alkylsulfinyl, (C_1–C_6)alkylsulfonyl, (C_1–C_6)alkylcarbonyl, di(C_1–C_3)alkylamino, (C_1–C_3)alkylcarbonylamino, (C_6–C_{10})aryl, (C_6–C_{10})-arylthio, cyano, nitro, halogen and halomethyl,

R^2 is a hydrogen atom or a (C_1–C_4)alkyl group when A is a halogen atom, and a hydrogen atom when A is other than a halogen atom;

R^3 is a (C_1–C_6) alkyl group;

R^4 is a (C_1–C_6)alkyl group; R^5 and R^6 are independently hydrogen atoms or (C_1–C_4)alkyl groups; and

Y is an oxygen or sulfur atom.

12. A method of controlling arthropods which comprises applying directly to the arthropods or to the loci to be freed of or protected from attack by such arthropods, an arthropodicidally effective amount of the compound of claim 1.

4,059,698

PESTICIDAL COMPOSITIONS SUITABLE FOR SPREADING FROM AIRCRAFT

Franco Pinamonti, and Sergio Maccone, both of Milan, Italy, assignors to Montecatini Edison S.p.A., Milan, Italy

Continuation of Ser. No. 798,782, Feb. 12, 1969, abandoned. This application Feb. 28, 1974, Ser. No. 447,011

Claims priority, application Italy, Feb. 14, 1968, 12725/68

Int. Cl.[2] A01N *9/36*

U.S. Cl. 424—211 **4 Claims**

1. Liquid pesticide composition suitable for being spread from aircraft containing a solution of N-monomethylamide of the O,O-dimethyldithiophosphoryl acetic acid in a mixture of a phenolic material selected from the group consisting of phenol, cresols, xylenols and mixtures thereof, and a mixture of aromatic and aliphatic hydrocarbons having a distillation starting point at atmospheric pressure above 150° C, a flammability point above 45° C, an aliphatic hydrocarbon content of from 0 to 35% and an aromatic hydrocarbon content of 65 to 100%, said solution being composed of at least 2% N-monomethylamide of the O,O dimethyldithiophosphoryl acetic acid, 0.5–50% of said phenolic material, and the remainder said mixture of aromatic and aliphatic hydrocarbons, said composition being stable at 0° C.

4,059,699

O,O-DIETHYL-O-CARBOXAMIDOPHOSPHATE ESTERS AND USE TO COMBAT INSECTS AND MITES

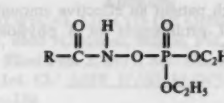
Gary M. Singerman, Allegheny County, Pa., assignor to Gulf Oil Corporation, Pittsburgh, Pa.

Division of Ser. No. 575,866, May 9, 1975, Pat. No. 3,994,997. This application June 7, 1976, Ser. No. 693,678

Int. Cl.[2] A01N *9/36*

U.S. Cl. 424—211 **11 Claims**

1. A method of combating insects and mites comprising applying to the locus of the insects and mites an effective amount, sufficient to kill a majority of said insects and mites of a compound of the structural formula:



in which R is selected from the group consisting of tert.butyl; 3,5-dimethylphenyl; 1-methyl-1-phenylthioethyl; 1-methyl-1-methylthioethyl; 1-cyclohexylthio-1-methylethyl; 1-cyclohexylthiopropyl; 1-ethylthio-1-methylethyl; 1-ethylthiopropyl and 1-ethylthioethyl.

4,059,700

DERMAL TOXICITY OF SOLID COMPOSITIONS CONTAINING A MONTMORILLONITE TYPE OF CLAY AND AN ORGANOPHOSPHORUS PESTICIDE

Alexander David Lindsay, East Brunswick, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed Feb. 17, 1976, Ser. No. 658,152

Int. Cl.[2] A01N *9/36*

U.S. Cl. 424—216 **3 Claims**

1. A composition possessing good insecticidal or nematocidal activity and low mammalian toxicity comprising (a) from 80% to 95%, by weight, of a montmorillonite type of clay consisting of 2:1 type of crystal lattice and containing 68% to 72.5%, by weight, of silica (SiO_2), 5% to 7%, by weight, of iron oxide (Fe_2O_3), 11% to 15%, by weight, of aluminum oxide (Al_2O_3), said clay being calcined at a temperature range from about 600° to about 1300° F, and (b) from 20% to 5%, by weight, of O,O-diethyl S-[(1,1-dimethylethyl)thio]phosphorodithioate.

4,059,701

15-SUBSTITUTED PROSTANOIC ACIDS FOR TREATING BRONCHIAL SPASM

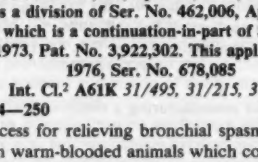
Donald Peter Strike, St. Davids, Pa., assignor to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 569,026, April 17, 1975, Pat. No. 4,022,821, which is a division of Ser. No. 462,006, April 18, 1974, abandoned, which is a continuation-in-part of Ser. No. 383,007, July 26, 1973, Pat. No. 3,922,302. This application Apr. 19, 1976, Ser. No. 678,085

Int. Cl.[2] A61K *31/495, 31/215, 31/19*

U.S. Cl. 424—250 **2 Claims**

1. A process for relieving bronchial spasm and facilitating breathing in warm-blooded animals which comprises administering to a warm-blooded animal in need thereof an amount sufficient to relieve bronchial spasm and facilitate breathing in said warm-blooded animal of a prostanoic acid of the formula:



wherein R is ethynyl, A is —CH_2—CH_2— and B is —CH_2—CH_2—; R is ethynyl, A is —CH_2—CH_2—, and B is trans —CH =CH—; or R is ethynyl, A is cis —CH=CH—; and B is trans —CH=CH—; and R^1 is hydrogen, alkyl of from 1 to about 6 carbon atoms, alkali metal, or a pharmacologically acceptable cation derived from ammonia or a basic amine.

4,059,702

3,8-BIS-BASIC ETHERS OF 6H-DIBENZO[b,d]PYRAN-6-ONE

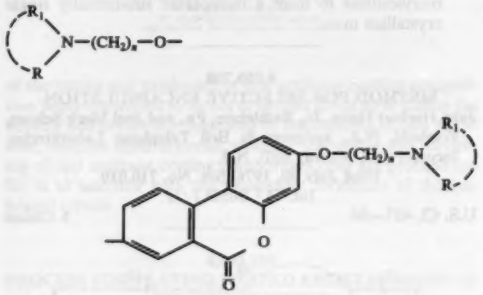
Donald R. Meyer, Goshen, Ohio, assignor to Richardson-Merrell Inc., Wilton, Conn.

Division of Ser. No. 317,237, Dec. 21, 1972, abandoned. This application Nov. 11, 1976, Ser. No. 740,806

Int. Cl.² C07D *413/14, 311/80;* A61K *31/365*

U.S. Cl. 424—248.55 7 Claims

1. A 3,8-bis-basic ether of 6H-dibenzo[b,d]pyran-6-one having the formula:



wherein *n* is an integer of from 2 to 6; R and R_1 are each selected from the group consisting of hydrogen, lower alkyl having from 1 to 6 carbon atoms, cycloalkyl having from 3 to 6 carbon atoms, alkenyl having from 3 to 6 carbon atoms in which the unsaturation is in a position other than the 1-position of the alkenyl group, and when R and R_1 are taken together with the nitrogen atom to which they are attached represent the pyrrolidinyl, piperidino or morpholino group; and the pharmaceutically acceptable acid addition salts thereof.

4. A method of preventing viral infections which comprises the daily prophylactic administration of from 0.1 milligrams to 500 milligrams per kilogram of body weight of a compound of claim 1 to a host susceptible to infection by pathogenic viral agents.

4,059,703

PESTICIDAL COMPOUNDS, PROCESSES AND COMPOSITIONS

Raymond Alexander Burrell, Camberley, and John Michael Cox, Wokingham, both of England, assignors to Imperial Chemical Industries Limited, London, England

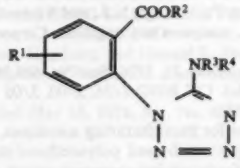
Filed Aug. 6, 1976, Ser. No. 712,378

Claims priority, application United Kingdom, Aug. 19, 1975, 34507/75

Int. Cl.² A61K *31/445;* C07D *257/04*

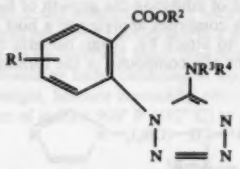
U.S. Cl. 424—269 7 Claims

1. A tetrazole derivative having the structural formula:



where R^1 is hydrogen or chlorine, R^2 and R^3 are hydrogen or alkyl containing 1 to 4 carbon atoms; R^4 is hydrogen, alkyl containing from 1 to 4 carbon atoms, cyclohexyl or acetyl; and salts thereof.

3. A process for combating fungi which comprises contacting said fungi or a locus thereof with an effective amount of a tetrazole derivative which has the formula:



where R^1 is hydrogen or chlorine, R^2 and R^3 are hydrogen or alkyl containing 1 to 4 carbon atoms; R^4 is hydrogen, alkyl containing from 1 to 4 carbon atoms, cyclohexyl or acetyl; or a salt thereof.

4,059,704

TETRAZOLE COUMARIN DERIVATIVES

Derek Richard Buckle, Redhill; Barrie Christian Charles Cantello, Horsham, and Harry Smith, Maplehurst, near Horsham, all of England, assignors to Beecham Group Limited, Great Britain

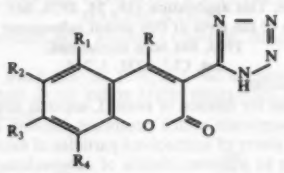
Division of Ser. No. 508,749, Sept. 24, 1974, abandoned. This application Apr. 1, 1976, Ser. No. 672,753

Claims priority, application United Kingdom, Oct. 11, 1973, 47484/73

Int. Cl.² A61K *31/41;* C07D *257/04*

U.S. Cl. 424—269 27 Claims

1. A method for the prophylaxis of asthma, hay-fever and rhinitis in humans which comprises administering to a human in need thereof orally, parenterally or by insufflation a compound of the formula



or a pharmaceutically acceptable salt thereof wherein R is lower alkyl, cyclopentyl, cyclohexyl, cycloheptyl or phenyl; R_1, is R_2, R_3 and R_4 are the same or different and each is hydrogen, lower alkyl, lower alkoxy, halogen, cyclohexyl, phenyl or benzyl; provided that when each of R_1, R_2, R_3 and R_4 is hydrogen, then R is not methyl, in an amount sufficient to be effective for the prophylaxis of asthma, hay-fever or rhinits, in combination with a pharmaceutically acceptable diluent or carrier suitable for said administration form.

4,059,705

DERIVATIVES OF SUBSTITUTED N-ALKYL IMIDAZOLES

Keith A. M. Walker, Palo Alto, Calif., assignor to Syntex (U.S.A.) Inc., Palo Alto, Calif.

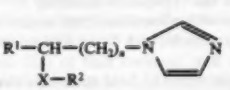
Continuation-in-part of Ser. No. 599,616, July 28, 1975, abandoned. This application Mar. 8, 1976, Ser. No. 665,024

Int. Cl.² A61K *31/415;* C07D *233/60*

U.S. Cl. 424—273 R 33 Claims

1. A compound of the formula

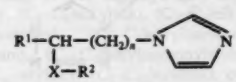
(I)



wherein X is sulfur, *n* is 1 or 2, and R^1 and R^2 are each indepen-

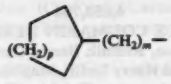
dently straight chain alkyl of from 1 to 12 carbon atoms such that the total number of carbon atoms in R^1 and R^2 is between 7 and 18; and the antimicrobial acid addition salts thereof.

31. A method of inhibiting the growth of fungi, bacteria or protozoa which comprises applying to a host object containing, or subject to attack by, fungi, bacteria or protozoa, an effective amount of a compound of the formula



(I)

wherein R^1 and R^2 are each independently alkyl of from 1 to 12 carbon atoms, cyclohexyl substituted with from one to three lower alkyl groups each having from 1 to 4 carbon atoms, or a group of the formula



wherein *m* is an integer of from 0 to 3 and *p* is an integer of from 1 to 3; X is sulfur or oxygen; *n* is an integer of from 1 to 8; or an antimicrobial acid addition salt thereof; or a composition containing same as an active ingredient.

4,059,706

SPRAY-DRIED L-ASPARTIC ACID DERIVATIVES

LaMonte D. Pischke, and Myron D. Shoaf, both of Danbury, Conn., assignors to General Foods Corporation, White Plains, N.Y.

Continuation-in-part of Ser. No. 448,845, March 7, 1974, Pat. No. 3,962,468. This application Feb. 14, 1975, Ser. No. 550,084

The portion of the term of this patent subsequent to Mar. 8, 1993, has been disclaimed.

Int. Cl.² A23L *1/236*

U.S. Cl. 426—548 **18 Claims**

1. A process for fixation of sweet L-aspartic acid derivative dipeptide compounds which comprises forming a dispersion containing a slurry of undissolved particles of said sweetening compound in an aqueous solution of encapsulating agent, the level of said undissolved sweetening compound solids being in excess of the total sweetening solids of said compounds in solution in said dispersion and the dispersion being maintained at a temperature low enough to assure the existence of at least a part of the sweetening compound as discretely distributed undissolved particles, and drying said dispersion to a moisture content below 5% and a density greater than 0.2 grams per cc. to encapsulate the particles of said sweetening compound in said encapsulating agent.

4,059,707

METHOD OF FILLING APERTURES WITH CRYSTALLINE MATERIAL

Roland Wright Smith, and Arnold Robert Moore, both of Princeton, N.J., assignors to RCA Corporation, New York, N.Y.

Filed Aug. 29, 1975, Ser. No. 609,005

Int. Cl.² B05D *3/06*

U.S. Cl. 427—35 **9 Claims**

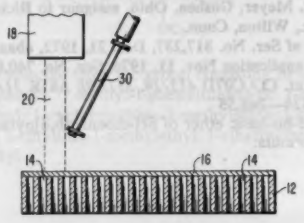
1. A method for filling a plurality of tiny apertures in a sheet with a transparent crystalline material comprising:

coating one surface of the sheet having aperture openings with a layer of the crystalline material;

heating the layer with a localized heat source so that a portion of the layer melts and flows into some of the apertures;

scanning the layer with the heat source so that the crystalline material flows into all of the apertures to be filled; and

bias heating the entire sheet to a temperature below the melting point of the crystalline material during the heating and scanning steps so that the material in each aperture



recrystallizes to form a transparent substantially single crystalline mass.

4,059,708

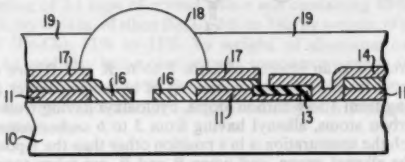
METHOD FOR SELECTIVE ENCAPSULATION

John Herbert Heiss, Jr., Bethlehem, Pa., and Joel Mark Schoen, Freehold, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed July 30, 1976, Ser. No. 710,010

Int. Cl.² B05D *1/32*

U.S. Cl. 427—96 **5 Claims**



1. A method of selectively encapsulating a solid state integrated circuit formed on an insulating board comprising the steps of:

depositing on a selected area of the circuit a mask in the form of a stable droplet in a dome configuration with a height within the range 30–50 mils, said mask comprising a water soluble polymer which is inert to the organic solvents included in the encapsulant;

applying an encapsulating material comprising a room temperature vulcanizing silicone rubber dissolved in an organic solvent to said circuit by flow coating the material over the area of the circuit not covered by said mask;

curing said encapsulating material; and

dissolving said polymer material by applying water thereto so as to expose the area of the circuit covered by said polymer and leave encapsulating material on the remaining area of the circuit.

4,059,709

PROCESSES OF APPLYING URETHANE TOP COATINGS TO RESILIENT FLOOR COVERINGS

Robert P. Conger, Park Ridge, N.J., and Vincent F. Pogozelski, Newtown, Pa., assignors to Congoleum Corporation, Kearny, N.J.

Filed May 21, 1976, Ser. No. 688,804

Int. Cl.² B05D *1/36, 3/00, 5/00*

U.S. Cl. 427—264 **10 Claims**

1. In a process for manufacturing a resilient, resinous floor covering having an embossed polyurethane surface coating, the inline manufacturing improvement which comprises: applying to a foamable resinous sheet material a urethane coating composition having a viscosity in the range of from about 10 centipoises to about 100 centipoises, the application of said urethane coating composition being accomplished by a reverse-roll coating procedure wherein the casting ratio is in the

range of from about 0.8:1 to about 1.1:1; and then, in an in-line manufacturing step, heating said coated, foamable, resinous sheet material to dry and cure and harden said urethane coating composition and subsequently to blow said foamable, resinous sheet material to form a resilient, resinous floor covering having an embossed polyurethane surface coating, the extent

APPLYING A PLASTISOL TO A BACKING SHEET AND GELLING THE PLASTISOL
PRINTING A PATTERN ON THE GELLED PLASTISOL
APPLYING A WEAR LAYER TO THE PRINTED GELLED PLASTISOL AND GELLING THE WEAR LAYER
APPLYING A URETHANE TOP COATING TO THE GELLED WEAR LAYER BY REVERSE-ROLL COATING MEANS AND HEATING AND BLOWING THE PRODUCT

of the curing and hardening of said urethane coating composition being controlled so as not to exceed about 80% during the heating and before the beginning of the blowing of said foamable, resinous sheet material, whereby the curing and hardening of said urethane coating composition does not proceed too far as to interfere with the subsequent formation of the embossed effects.

4,059,710

PROCESS FOR PLATING SHAPED ARTICLES MADE OF SYNTHETIC RESINS

Keizo Nishiyama, Handa; Sadao Maeda, Okazaki, and Kohshi Iwata, Tokai, all of Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho and Kabushiki Kaisha Maeda Shell Service, both of, Japan

Filed July 2, 1976, Ser. No. 702,098
Claims priority, application Japan, July 2, 1975, 50-82129
Int. Cl.² C23C *3/02*
U.S. Cl. 427—307 **11 Claims**

1. Process for plating a casting tool of a synthetic resin, comprising the steps of:

a. applying an adhesive agent over the surface of a master pattern used to shape said article;
b. diffusing fine metal particles or pieces of non-uniform particle size over the layer of adhesive agent to cause said particles or pieces to settle densely over the surface of the master pattern;
c. pouring said synthetic resin in a molten state in order to shape the casting tool further over said adhesive agent;
d. solidifying the synthetic resin;
e. separating the solidified synthetic resin from the master pattern;
f. removing the adhesive agent to expose surfaces of the metal particles or pieces;
g. etching the exposed surfaces of the metal particles or pieces; and
h. chemically plating metal over the surface of the article.

4,059,711

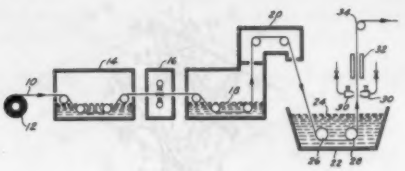
PARTIALLY ALLOYED GALVANIZE PRODUCT AND METHOD

George M. Mino, Hamburg, and Donald L. Dustin, Elma, both of N.Y., assignors to Bethlehem Steel Corporation, Bethlehem, Pa.

Filed May 14, 1976, Ser. No. 686,961
Int. Cl.² C23C *1/02*
U.S. Cl. 427—310 **10 Claims**

1. A process for producing an improved galvanized coating on a ferrous strand, which coating is characterized by an iron-zinc intermetallic layer consisting essentially of the zeta phase and a surface layer of free zinc, said process comprising:

a. cleaning said ferrous strand to remove oxides therefrom,
b. protecting said ferrous strand against reoxidation by the application of a flux to the oxide free surfaces of said strand,
c. heating said ferrous strand to a temperature sufficient to dry said flux in situ without burning such flux off the said ferrous strand prior to its immersion in a galvanizing bath,
d. immersing said heated and oxide free ferrous strand in a molten galvanizing bath containing at least 0.15% aluminum, by weight, balance essentially zinc maintained at a temperature of at least 900° F (482° C) to produce a coating on said ferrous strand of between 0.2 to 0.5 oz. per square foot of strand,



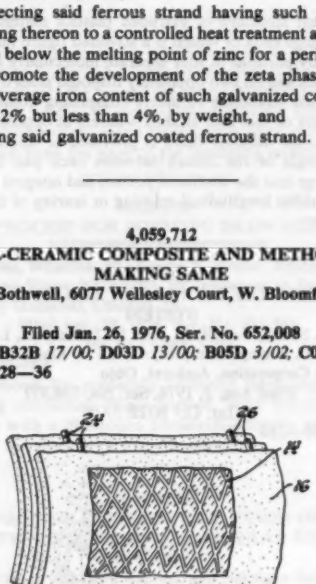
e. subjecting said ferrous strand having such galvanized coating thereon to a controlled heat treatment at a temperature below the melting point of zinc for a period of time to promote the development of the zeta phase, wherein the average iron content of such galvanized coating is at least 2% but less than 4%, by weight, and
f. cooling said galvanized coated ferrous strand.

4,059,712

METAL-CERAMIC COMPOSITE AND METHOD FOR MAKING SAME

Bruce E. Bothwell, 6077 Wellesley Court, W. Bloomfield, Mich. 48033

Filed Jan. 26, 1976, Ser. No. 652,008
Int. Cl.² B32B *17/00;* **D03D** *13/00;* **B05D** *3/02;* **C04B** *33/34*
U.S. Cl. 428—36 **9 Claims**



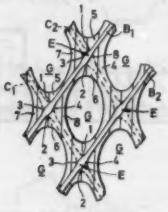
1. A high temperature insulation of a metalceramic composite comprising a rigid metal wall, a monolithic, layer of ceramic positioned adjacent the metal wall and having imbedded therein a metal grid including openings of substantially the same size and shape, said composite having been made by coating said metal grid so as to fill the grid openings with ceramic slurry to provide a layer of the ceramic having imbedded therein said metal grid, heating said layer of ceramic with said metal grid therein to a temperature at which the ceramic forms into a monolithic ceramic body, and thereafter cooling said ceramic body with said metal grid therein, said metal grid having a melting temperature higher than said temperature at which said ceramic forms into said monolithic ceramic body and said metal grid having a higher coefficeint of thermal expansion than that of said ceramic, and said grid openings having a size of from about one-sixty-fourth inch to three-eighth inch and the aggregate area of the openings constituting from about 30% to 80% of the total area fo the grid.

4,059,713

EXTRUDED PLASTICS NET OR MESH STRUCTURES

Frank Brian Mercer, Blackburn, England, assignor to Netlon Limited, Blackburn, England

Filed Aug. 23, 1976, Ser. No. 716,560
Claims priority, application United Kingdom, Sept. 5, 1975, 36729/75
Int. Cl.[2] B32B 5/12
U.S. Cl. 428—36 3 Claims



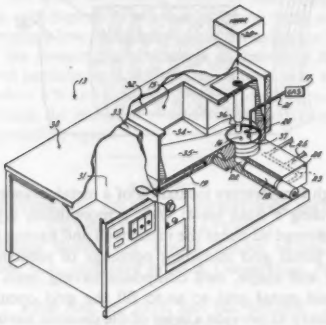
1. A mesh structure of extruded plastics material having mesh openings each of which is a six-sided figure bounded on four sides by portions of four separate molecularly orientated mesh strands and on two oppositely disposed sides by molecularly oriented strandlike members comprising confluent portions of pairs of said four strands wherein at opposite ends of each strandlike member there is provided in and across the included angle of the crotch between each pair of strands which merge into the confluent portion and integral therewith a web to inhibit longitudinal splitting or tearing of the strandlike member.

4,059,714

HOT MELT THERMOPLASTIC ADHESIVE FOAM SYSTEM

Charles H. Scholl, Vermilion; John R. Janner, Jr., Lorain, and William C. Stumphauzer, Elyria, all of Ohio, assignors to Nordson Corporation, Amherst, Ohio

Filed Aug. 2, 1976, Ser. No. 710,377
Int. Cl.[2] B32B 5/18
U.S. Cl. 428—310 36 Claims



1. The method of bonding with a hot melt thermoplastic adhesive foam which comprises,

heating solid thermoplastic adhesive to convert it to a liquid state,

mechanically agitating the liquid adhesive in the presence of a gas so as to obtain a mixture of said gas in the liquid adhesive,

pressurizing the mixture of liquid and gas so as to force the gas into solution with the liquid adhesive,

dispensing the liquid and gas solution at atmospheric pressure whereby said gas is released from solution and forms a hot adhesive foam, and

compressing said hot adhesive foam between two substrates to force gas from the foam and to form a bond between said substrates.

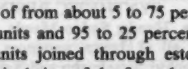
4,059,715

ADHESIVE COMPOSITION AND SHEET-LIKE PRODUCT FORMED THEREWITH

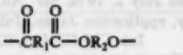
Wayne A. Pletcher, Roseville, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 591,935, June 30, 1975, abandoned. This application June 25, 1976, Ser. No. 699,976
Int. Cl.[2] C09J 7/02
U.S. Cl. 428—349 34 Claims

1. A sheet backing provided on at least one major surface with a thermoplastic, coherent layer which essentially comprises a segmented copolyester capable of forming a strong, dependable bond to a substrate at a temperature below its melting temperature and without the involvement of volatiles consisting essentially of from about 5 to 75 percent by weight of amorphous ester units and 95 to 25 percent by weight of crystallizable ester units joined through ester linkages, the crystallizable ester units being of the formula:



and the amorphous ester units being of the formula:



wherein R_1 consists of residues of one or more diacids selected from saturated aliphatic dicarboxylic acids containing from 4 to 10 carbon atoms and aromatic dicarboxylic acids selected from terephthalic acid, isophthalic acid, phthalic acid, 4,4'-benzophenone dicarboxylic acid, 4,4'-diphenylmethane dicarboxylic acid, 4,4'-diphenylether dicarboxylic acid, 4,4'-diphenylthioether dicarboxylic acid and 4,4'-diphenylamine dicarboxylic acid, R_2 consists of residues of one or more saturated aliphatic diols containing from 2 to 12 carbon atoms, R_3 is R_1 or R_5, R_4 is R_2 or R_6, R_5 consists of the divalent radicals containing from about 22 to 50 carbon atoms which remain after removal of the carboxyl groups from saturated aliphatic dimer acids and R_6 consists of the divalent radicals remaining after removal of the hydroxyl groups of long chain aliphatic diols having an average molecular weight of 200 to 4000, provided that at least one of R_3 and R_4 in each amorphous ester unit is R_5 or R_6, and provided that when R_1 is aromatic, R_2 contains from 6 to 12 carbon atoms and the amorphous content is 50–75 percent by weight, the said copolyester having a DTA melting temperature of from about 25° to 150° C., an inherent viscosity of at least 0.5 dl/g at 25° C., as measured in 0.3 g/dl solutions of polymer in chloroform at 25° C., an open time of at least about ¼ minute at 20° C., substantially complete solubility in toluene at 25° C. in the ratio of about 10 percent by weight of copolyester and 90% by weight of solvent, a tensile strength of 100–400 kg/cm², an elongation at break of 400–1000 percent, a T-peel adhesion to vinyl of at least 0.9 kg/cm of width and a DTA glass transition temperature, T_g, below −25° C.

4,059,716

MANUFACTURE OF GAMMA-IRON(III) OXIDE

Helmut Kopke, Ludwigshafen; Manfred Ohlinger, Frankenthal; Werner Grau, Willstaett; Eduard Schoenafinger, Ludwigshafen, and Hans Henning Schneehage, Mutterstadt, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed June 12, 1975, Ser. No. 586,346
Claims priority, application Germany, June 14, 1974, 2428875
Int. Cl.[2] H01F *1/11, 10/02*
U.S. Cl. 428—403 5 Claims

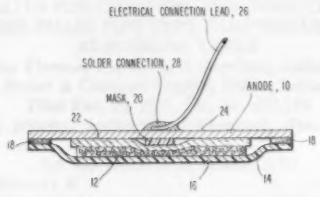
1. A process for the manufacture of acicular gamma-iron-(III) oxide of high coercive force which comprises: contacting an acicular non-magnetic alpha-iron(III) oxide or goethite pigment with a solution of an organic compound; drying the coated pigment, heating the coated pigment to from 250° to 700° C in an inert or reducing gas atmosphere and subsequently oxidizing the magnetite formed in an oxidizing atmosphere at from 150° to 550° C, wherein the pigment is coated with from 0.5 to 10% by weight, based on the pigment, of said compound and is selected from the group consisting of N-oleyl-methylaminoacetic acid, N-dimethyl-tridecyclpropiobetaine, $R_2HN^+—CH_2—Ch_2OPO_3H^-$, the calcium salt of the betaine of N,N-dimethyl-N-sulfobenzyl-aniline-3-sulfonic acid and soybean lecithin.

4,059,717

BATTERY HAVING MASK WHICH ELECTROCHEMICALLY INACTIVATES LIMITED SURFACE OF METALLIC COMPONENT

Alf Marlov Bredland, Middleton; Walter Lee Fong, Madison; Terry Glen Messing, Verona, and John Walter Paulson, Madison, all of Wis., assignors to ESB Incorporated, Philadelphia, Pa.

Filed Oct. 26, 1976, Ser. No. 735,827
Int. Cl.[2] H01M *2/32*
U.S. Cl. 429—162 32 Claims



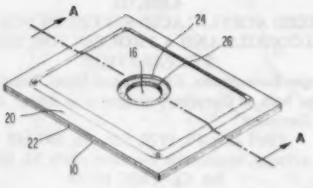
1. An improvement in a flat battery having a metallic foil component the inner surface of which is in contact with the battery electrolyte and the outer surface of which is not in contact with the electrolyte, the improvement providing means for preventing undesired corrosion of the metallic component, the improvement comprising a mask over a portion of the inner surface which electrochemically inactivates the portion of the inner surface covered by it.

4,059,718

COMPOSITE OF METAL AND INSULATING MATERIAL WITH SETBACK WHICH EXPOSES BATTERY TERMINAL

Terry Glen Messing, Verona, Wis., assignor to ESB Incorporated, Philadelphia, Pa.

Filed Oct. 26, 1976, Ser. No. 735,828
Int. Cl.[2] H01M *2/02*
U.S. Cl. 429—162 8 Claims



1. The combination of
   a. a battery having a terminal;
   b. a composite of metal and an insulating material overlaying the battery terminal and having openings in both the metal and insulating material which expose the terminal, the insulating material being situated between the metal and the terminal, the composite being further described as having a portion of the insulating material extend inside the opening of the metal layer so that edge of the metal is set back from the edge of the insulating material.

4,059,719

PROCESS FOR FORMING BRANCHED NITROPOLYPHENYLENE

Eli W. Blaha, Wheaton, Ill.; Sandra K. Koster, Aiken, S.C., and Chen-Shen Wang, Naperville, Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed Apr. 29, 1976, Ser. No. 681,751
Int. Cl.[2] C08F *8/00*
U.S. Cl. 526—52 4 Claims

1. A process for preparing branched nitropolyphenylene comprising contacting finely-divided, solid branched polyphenylene with a dinitrogen tetraoxide-nitrogen dioxide gas mixture in the absence of a liquid diluent.

4,059,720

PROCESS FOR THE PRODUCTION OF POLYETHYLENE HAVING MOLECULAR WEIGHTS ABOVE 500,000

Helmut Kolling; Friedrich Rappen, and Nikolaus Geiser, all of Oberhausen, Germany, assignors to Ruhrchemie Aktiengesellschaft, Oberhausen-Holten, Germany

Continuation of Ser. No. 528,737, Dec. 2, 1974, abandoned. This application Mar. 31, 1976, Ser. No. 672,140
Claims priority, application Germany, Dec. 11, 1973, 2361508
Int. Cl.[2] C08F *4/66, 10/02*
U.S. Cl. 526—74 4 Claims

1. A process for preparing polyethylene having a viscosimetrically determined molecular weight greater than about 500,000, said process comprising the steps of:
   A. Reducing a titanium (IV) halide with an aluminum alkyl compound of the formula AlR_3 or $AlXR_2$, wherein R is an alkyl radical having 2 to 10 carbon atoms and X is halogen whereby an activated titanium (III) halide is formed, and
   B. Polymerizing ethylene having an oxygen content of less than 1 ppm. in the presence of
      a. a hydrocarbon solvent having a boiling point in the range of 80° C. – 200° C., said solvent having been pre-purified by hydrogenation,
      b. a catalyst comprising said activated titanium (III) halide and an aluminum alkyl compound, in a respective molar

ratio of 1:0.2 to 1:5, said aluminum compound being of the formula AlR_3 or $AlXR_2$, wherein R is an alkyl radical having 2 to 10 carbon atoms and X is halogen, and

c. a mono - or polyhydric alcohol having 2 – 5 carbon atoms in an amount of 2 to 10 moles per kg. of catalyst; said polymerizing being conducted at a pressure of 1 to 100 atmospheres at a temperature of 30° C. to 100° C.

4,059,721

STABILIZED ACRYLIC ACID ESTERS OF POLYHYDRIC ALCOHOLS AND A PROCESS FOR THEIR PREPARATION

Hans Jürgen Rosenkranz, Krefeld, and Hans Rudolph, Krefeld-Bockum, both of Germany, assignors to Bayer Aktiengesellschaft, Germany

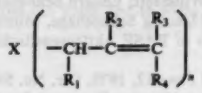
Filed July 18, 1975, Ser. No. 597,168

Claims priority, application Germany, July 24, 1974, 2435509

Int. Cl.[2] C07C 69/54

U.S. Cl. 560—205 **7 Claims**

1. A composition comprising an acrylic acid ester of a polyhydric alcohol having at least two acrylate moieties and a stabilizing amount of an allyl compound of the formula



wherein R_1–R_4 are hydrogen or alkyl having 1 to 4 carbon atoms;

X is chlorine, bromine, hydroxy,

wherein R_5 is an n-valent aliphatic, araliphatic, cycloaliphatic or aromatic hydrocarbon radical which may contain free hydroxy moieties or —O— linking moieties and R_6 is an n-valent aliphatic, cycloaliphatic, araliphatic or aromatic radical and n is an integer of from 1 to 4.

4,059,722

TERMINAL CONNECTOR FOR ELECTRICAL CABLES

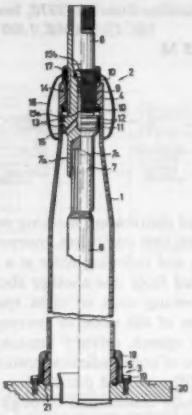
Horst Adler; Werner Grella, and Hans-Peter Israel, all of Cologne, Germany, assignors to Felten & Guilleaume Kabelwerke Aktiengesellschaft, Cologne, Germany

Filed Oct. 1, 1975, Ser. No. 618,312

Claims priority, application Germany, Oct. 12, 1974, 2448705

Int. Cl.[2] H02G *15/22, 15/04*

U.S. Cl. 174—19 13 Claims



1. A terminal connector for electrical cables, particularly high-current electrical cables, comprising an electrically-insulating casing having a circumferential wall bounding an interior for accommodation of an end portion of an electrical cable, and an end region formed with an opening; a conductive member having an inner portion located within said casing and being connectable to the end portion of the cable, and an outer portion extending through said opening outwardly of said casing; adjusting means for movably mounting said conductive member through a range of positions relative to said casing; and means for sealing the interior of said casing from its exterior including during operation of said adjusting means, said sealing means including an annular projection located on said inner portion remote from said opening, said projection extending in radial direction towards said circumferential wall and being formed with a circumferential groove, said sealing means also including a resilient sealing element accommodated in said groove and having a side facing and in sliding engagement with said circumferential wall so as to seal the interior from the exterior of said casing through the entire adjustment range of said conductive member.

4,059,723

APPARATUS FOR CHANGING THE DIRECTION OF A THREE-PHASE PIPE-TYPE GAS-PRESSURIZED ELECTRICAL CABLE

Carl Dieter Floessel, Fislisbach, Switzerland, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland

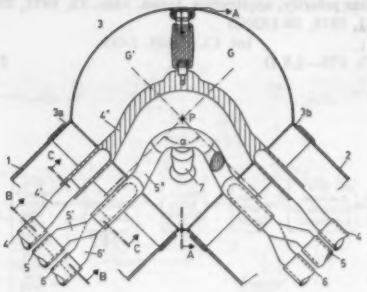
Filed Dec. 22, 1975, Ser. No. 643,114

Claims priority, application Switzerland, Jan. 10, 1975, 275/75

Int. Cl.[2] H01B *9/00;* H02G *15/08*

U.S. Cl. 174—21 R 3 Claims

1. In a three-phase pipe-type gas-pressurized electrical cable constituted principally by rigid straight pipe lengths connected in series and wherein the axes of the three phase conductors supported within the pipe when viewed in cross-section form an equilateral triangle, the improvement wherein means are provided for changing the direction of the cable, said direction-changing means comprising a spherical elbow interposed between two straight pipe lengths, said elbow including a pair of branch pipe stubs connected to the ends of the adjoining straight pipe lengths and three curved conductor members supported in spaced relation within said elbow, one of said curved conductor members and which has the largest radius of curvature being located in a plane formed by the respective axes of said two branch pipe stubs which intersect at the center of said elbow and the other two curved conductor members



having a smaller radius of curvature being located at equal distances on each side of said plane, and three intermedite conductor sections connecting and adapting the respective positions of the ends of the three conductors supported within the adjoining pipe lengths to their correlated conductor members within said elbow.

4,059,724

SHIELD WIRE

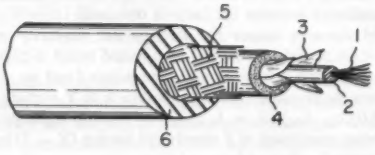
Homare Ide, 22, Hazawa 2-Chome, Nerima, Tokyo, Japan

Filed Mar. 15, 1976, Ser. No. 667,032

Claims priority, application Japan, Mar. 22, 1975, 50-37197[U]

Int. Cl.[2] H01B *11/06*

U.S. Cl. 174—36 5 Claims



1. A shield wire comprising:
an inner conductor of metal;
a first dielectric surrounding said inner conductor;
a second dielectric placed on top of said first dielectric;
a middle conductor formed of a mixture of carbon powder and plastic and having a relatively high resistance placed over said second dielectric;
a braid of metal woven over said middle conductor to form an outer conductor; and
a covering of electric dielectric placed on top of said braid.

4,059,725

AUTOMATIC CONTINUOUS SPEECH RECOGNITION SYSTEM EMPLOYING DYNAMIC PROGRAMMING

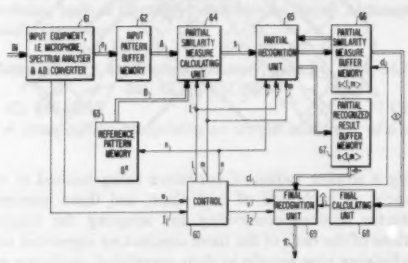
Hiroaki Sakoe, Tokyo, Japan, assignor to Nippon Electric Company, Ltd., Tokyo, Japan

Continuation of Ser. No. 665,759, March 11, 1976, abandoned. This application Dec. 21, 1976, Ser. No. 753,072

Claims priority, application Japan, Mar. 12, 1975, 50-29891; Oct. 31, 1975, 50-132003

Int. Cl.² G10L 1/00

U.S. Cl. 179—1.5 D 5 Claims


INPUT EQUIPMENT, I.E. MICROPHONE, SPECTRUM ANALYSER & A.D. CONVERTER
INPUT PATTERN BUFFER MEMORY
PARTIAL SIMILARITY MEASURE CALCULATING UNIT
PARTIAL RECOGNITION UNIT
PARTIAL SIMILARITY MEASURE BUFFER MEMORY
PARTIAL RECOGNIZED RESULT BUFFER MEMORY
REFERENCE PATTERN MEMORY
CONTROL
FINAL RECOGNITION UNIT
FINAL CALCULATING UNIT

1. A speech pattern recognition system for continuous speech composed of a series of words pronounced word by word, said system comprising:

means for producing from said continuous speech an input pattern A representative of time sequences of feature vectors $a_1, a_2 \cdots a_i, \cdots a_I$;

first memory means for storing said input pattern A;

second memory means for storing n reference word patterns B^n, each representing by time sequences of feature vectors $b_1^n, b_2^n, \cdots b_j^n, \cdots b_{jn}^n$;

means for reading out a partial pattern $A(l,m)$ which is a part of said input pattern A extending from a time point l to another time point m $(1 \leqq l < m \leqq I)$, said partial pattern $A(l,m)$ being represented by time sequence of feature vectors $a_{l+1}, a_{l+2}, \cdots a_i, \cdots a_m$;

first means for calculating through dynamic programming similarity measures $S(A(l,m), B^n)$ between said partial pattern $A(l,m)$ and said reference word pattern B^n;

means for extracting the maximum value of the partial similarity measures $S<l,m>$ with respect to n words;

means for providing a partial recognized result $n<l,m>$ which is a word in said n words and by which said partial similarity measure $S<l,m>$ is obtained;

third memory means for said partial similarity measure $s<l,m>$ and said partial recognized result $n<l,m>$ obtained with respect to said time points l and m;

means for dividing said input pattern A to Y partial patterns $A(l_{(x-1)}, L_{(x)})$ $(X = 1, 2, 3, \cdots Y)$, said input pattern A being composed of Y words and having $(Y - 1)$ breaking points $l_{(1)}, l_{(2)} \cdots l_{(x)} \cdots l_{(Y-1)}$;

means responsive to said partial similarity measure $S<l,m>$ and said partial recognized result $n<l,m>$ for reading out the partial similarity measures $S<O,l_{(1)}>, S<l_{(1)},l_{(2)}>, \cdots S<l_{(x-1)}, l_{(x)}>, \cdots S<l_{Y-1)}, l_{(Y)}>$ with respect to the combinations $(O,l_{(1)}), (l_{(1)}, l_{(2)}), \cdots (l_{(x-1)}, l_{(x)}), \cdots (l_{(Y-1)}, l_{(Y)})$ of said breaking points;

second means for calculating the maximum value of the sum of said partial similarity measures $S>O,l_{(1)}>+S<l_{(1)}, l_{(2)}>+\cdots+S<l_{(x-1)}, l_{(x)}>\cdots+S<l_{(Y-1)}, l_{(Y)}>$; and

means responsive to said second calculating means and said partial recognized result n, m for providing Y words.

4,059,726

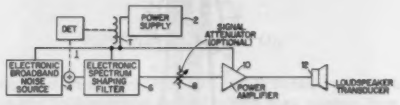
PROCESS AND APPARATUS FOR SPEECH PRIVACY IMPROVEMENT THROUGH INCOHERENT MASKING NOISE SOUND GENERATION IN OPEN-PLAN OFFICE SPACES AND THE LIKE

Bill G. Watters, Gloucester; Michael Nacey, Belmont, and Thomas R. Horrall, Harvard, all of Mass., assignors to Bolt Beranek and Newman, Inc., Cambridge, Mass.

Continuation of Ser. No. 527,941, Nov. 29, 1974, abandoned. This application June 18, 1976, Ser. No. 697,562

Int. Cl.² H04K 1/00

U.S. Cl. 179—1.5 M 14 Claims



1. A process of distributing masking sound in an open-plan space and the like, that comprises, independently and incoherently generating and radiating noise at a plurality of positions laterally separated from one another above a sound-transmitting surface covering such an open space; shaping the frequency spectrum of the noise to correspond substantially to that desired for speech privacy masking; and adjusting the lateral separation of noise radiation positions from one another to control the diffusion and distribution of the masking noise sound cumulatively transmitted through and below said surface into the open space, in order to provide a uniform, delocalized incoherent masking radiation within said open space.

4,059,727

DATA TRANSMISSION SYSTEM BETWEEN TELEPHONE SUBSCRIBER LOCATION AND TELEPHONE EXCHANGE LOCATION DURING IDLE TELEPHONE CONDITION

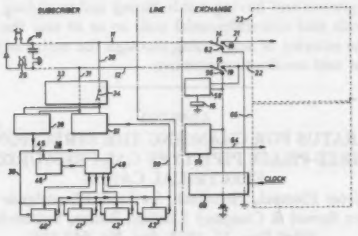
Leonard William Kingswell, Uxbridge, and Oliver Charles Matthews, Edgware, both of England, assignors to The Post Office, London, England

Filed Jan. 3, 1977, Ser. No. 756,004

Claims priority, application United Kingdom, Jan. 9, 1976, 848/76

Int. Cl.² H04M 11/00

U.S. Cl. 179—2 AM 15 Claims



1. A data transmission system for transmitting information over a telephone line comprising a line for connecting the telephone to a telephone exchange, first idle line sensing means associated with the subscriber end of the line and operable to connect the line to subscriber data equipment when the line is sensed to be in an idle condition and to disconnect the line from subscriber data equipment when the line is sensed to be in a busy condition, second idle line sensing means associated with the exchange end of the line and operable to connect the line to exchange data equipment when the line is sensed to be in an idle condition, and to disconnect the line from the exchange data equipment when the line is sensed to be in a busy condition, the arrangement being such that a data transmission cir-

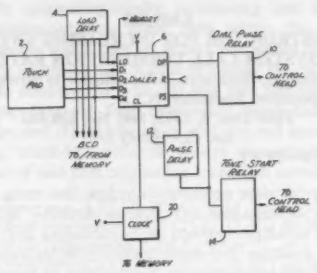
cuit is established between the exchange data equipment and the subscriber data equipment when the line is in the idle condition.

4,059,728

TOUCHPAD DIALER FOR MOBILE TELEPHONES

C. Paul Milkes, Encino, Calif., assignor to American Communication Systems, Encino, Calif.

Filed June 1, 1976, Ser. No. 691,427
Int. Cl.[2] H04Q 7/04
U.S. Cl. 179—2 E **11 Claims**



1. A touchpad dialer for mobil telephones having a control head and wherein dial pulses are transmitted to a central office as interruptions in a tone comprising:

a touchpad keyboard means having a plurality of keyboard buttons, each of said buttons being assigned one alpha-numeric symbol, said keyboard means generating an output signal when one of said buttons is depressed, said output signal being an electrical representation of the alpha-numeric symbol assigned to said button;

a dial pulse control means coupled to said control head of said mobil telephone for interrupting said tone in response to a control signal;

a means for converting said output signals from said keyboard to said control signals for said dial pulse control means;

a tone start control means coupled to said control head of said mobil telephone for turning on said tone; and

a means coupled to said converting means for actuating said tone start control means some predetermined time before said control signals are transmitted to said dial pulse control means and for keeping said tone pulse control means actuated for some predetermined time after said control signals to said dial pulse control means cease.

4,059,729

METHOD AND SYSTEM FOR SELECTIVELY ACCESSING MULTIPLEXED DATA TRANSMISSION NETWORK FOR MONITORING AND TESTING OF THE NETWORK

Wesley L. Eddy, Howey-in-the-Hills; Daniel J. Mullen, and Arthur R. Bonham, both of Orlando, all of Fla., assignors to Martin Marietta Aerospace, Orlando, Fla.

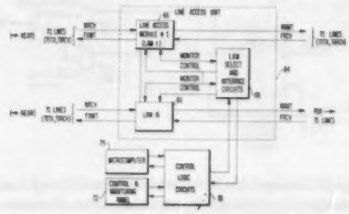
Filed June 9, 1976, Ser. No. 694,302
Int. Cl.[2] H04J 3/14
U.S. Cl. 179—15 BF **20 Claims**

1. In a multiplexed data transmission system receiving data from a plurality of data channels and time division multiplexing the received data for transmission over a transmission path as a multiplexed data stream containing a predetermined pattern of framing signals together with the data from the plurality of data channels positioned in time at predetermined data channel locations relative to the pattern of framing signals, a system for accessing data of a desired data channel comprising:

line access means connected in series with the transmission path for accessing the multiplexed data stream without disturbing the transmission of the multiplexed data stream along the transmission path;

means responsive to the multiplexed data stream from said line access means for detecting the framing signals in the multiplexed data stream;

means for generating a control signal designating one of the plurality of data channels as the desired data channel;



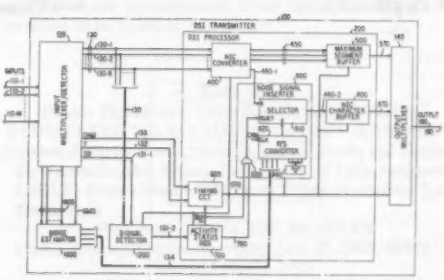
means receiving said multiplexed data stream and, responsive to said control signal and to the detected framing signals, for locating and providing access to the designated one of the plurality of data channels in the multiplexed data stream without disturbing the transmission of the multiplexed data stream over the transmission path.

4,059,730

APPARATUS FOR MITIGATING SIGNAL DISTORTION AND NOISE SIGNAL CONTRAST IN A COMMUNICATIONS SYSTEM

David Gavin Messerschmitt, Middletown, and Timothy James Zebo, Freehold, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Aug. 17, 1976, Ser. No. 715,122
Int. Cl.[2] H04J 6/02
U.S. Cl. 179—15 AS **11 Claims**



4. Communications apparatus having an input terminal adapted to receive an input signal from a trunk and having an output terminal adapted to transmit an output signal to a channel, said communications apparatus including detection apparatus for detecting the activity status of said trunk, characterized in that said communications apparatus further comprises:

means for mitigating contrast between an input signal detected during a first trunk activity status state and an input noise signal detected during a second trunk activity status state, said contrast mitigating means including

means responsive to said second activity status state for measuring noise on said trunk, and

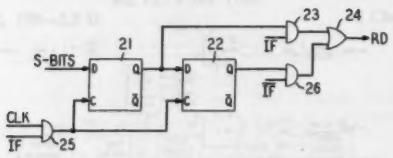
means responsive to said noise measuring means for extending a representation of said measure to said output terminal upon transition of said first activity state to said second activity state.

4,059,731

SIGNALING STORAGE IN DIGITAL CHANNEL BANKS

John Henry Green, Georgetown, Mass., and Joseph Elide Landry, Atkinson, N.H., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Feb. 1, 1977, Ser. No. 764,571
Int. Cl.[2] H04J 3/12
U.S. Cl. 179—15 BY **6 Claims**



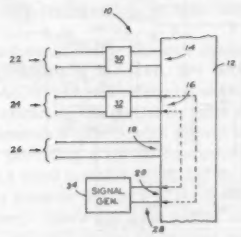
1. A digital channel bank wherein a plurality of incoming digital messages is received in separate time division multiplexed channels and signaling information bits for each channel are disposed at predetermined positions in the incoming digital message bit stream, the signaling bits being separated out from the incoming bit stream in the channel bank; said digital channel bank being characterized by a signaling storage circuit for each channel comprising means for storing two or more of the most recent signaling information bits of the channel, means for continually updating the stored signaling bits, means for stopping said updating when a carrier disturbance is detected in the incoming digital message bit stream, and means for deriving an output signal in accordance with an older stored signaling bit when a disturbance is detected.

4,059,732

CENTRALIZED TELEPHONE ANSWERING APPARATUS WITH REMOTE ACCESSING

Robert W. Hayden, Clackamas, and Glenn Clarridge, Portland, both of Oreg., assignors to Ford Industries, Inc., Portland, Oreg.

Filed July 9, 1976, Ser. No. 703,745
Int. Cl.[2] H04M 3/42
U.S. Cl. 179—18 B **4 Claims**



1. Apparatus in a telephone system for accessing, from a subscriber's telephone line in the system, a remote associated answering device located adjacent central switching circuitry in the system, which circuitry includes a plurality of ports each operatively connectable to a different telephone line and means for producing selected couplings through said circuitry between different pairs of said ports, said apparatus, in operative condition with respect to such equipment, comprising

an electrical signal generator operatively connected to one of said ports and operable, on a call being recevied at said one port through said switching circuitry, to apply an electrical signal to said one port, and through said one port and said switching circuitry to the particular port then coupled through said switching circuitry with said one port,

electrical switching means operatively interposed between said subscriber's line, said answering device and another one of said ports, normally producing a closed connection between said other port and said line, and an open connection between said other port and said answering device, and

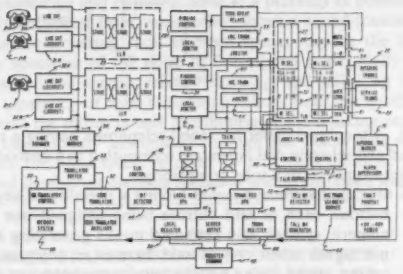
a sensor operatively connected both to said line and to said switching means responsive to the occurrence on said line of signal received through said other port and said switching circuitry from said signal generator, to actuate said switching means, thus to open said normally closed connection and to close said normally open connection.

4,059,733

CALL DISTRIBUTOR FOR INCREASING SWITCHING SYSTEM CALL TERMINATION RATE

Otto Altenburger, Rochester, N.Y., assignor to Stromberg-Carlson Corporation, Rochester, N.Y.

Filed Dec. 8, 1975, Ser. No. 638,443
Int. Cl.[2] H04Q 3/47
U.S. Cl. 179—18 ET **2 Claims**



2. In an electronic switching system, the combination comprising:

first and second line-link network groups, each of said groups comprising a plurality of line units, said line units providing paths between local subscribers and the system;

a plurality of local registers operatively associated with said first and second line-link network groups;

a plurality of incoming trunks providing paths between remote telephone switching systems and the system;

a plurality of trunk registers operatively associated with said plurality of incoming trunks;

first and second originating trunk-link network groups for establishing paths for calls which have entered the system through said first and second line-link network groups, respectively, and for calls which have entered the system through said plurality of incoming trunks;

one and another terminating trunk-link network groups which are selectively transposable in their connection to said first and second originating trunk-link network groups, said one and another terminating trunk-link network groups being operative to establish paths to call termini;

number translator means for translating calls which terminate locally;

code translator means for translating calls which terminate at an outgoing trunk;

said plurality of local registers being operatively connected to either one or the other of: (I) said number translating means, and (II) said code translating means, depending upon whether the originating local subscriber dialed a local call or an outgoing trunk call, said plurality of local registers being operative to temporarily store information for completing the terminating portion of a phone call;

said plurality of trunk registers being operatively connected to either one or the other of: (A) said number translating means, and (B) said code translating means, depending upon whether the call originator dialed a local call or an

outgoing trunk call, said plurality of trunk registers being operative to temporarily store information for completing the terminating portion of a phone call;

means for monitoring the plurality of local registers and the plurality of trunk registers to identify a pair of calls comprising a locally originating-locally terminating call which originated in one of said first and second line-link network groups and a locally originating-outgoing trunk call which originated in the other of said first and second line-link network groups; and

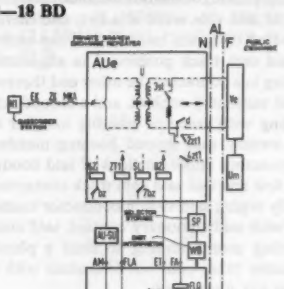
means for terminating the identified pair of calls within a time frame which includes temporary storage of both the locally originating-locally terminating and the locally originating-outgoing trunk calls within the respective registers in which they are stored, said means for terminating the identified pair of calls providing the calls termination in cooperation with: (1) said first line-link network groups, (2) said first originating trunk-link network groups, and (3) whichever of said one and another terminating trunk-link network groups is connected to the output of said first originating trunk-link network groups for a given call, and in cooperation with: (a) said second line-link network groups, (b) said second originating trunk-link network groups, and (c) whichever of said one and another terminating trunk-link network groups is connected to said second originating trunk-link network groups for a given call.

4,059,734

METHOD FOR TRANSFERRING DATA INTO A DATA INPUT DURING A TELEPHONE CONNECTION ESTABLISHED OVER AN INTEROFFICE TRUNK

Robert Vanderbusse, Oostende, Belgium, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Oct. 21, 1975, Ser. No. 624,552
Claims priority, application Germany, Oct. 22, 1974, 2450189
Int. Cl.² H04M 3/58
U.S. Cl. 179—18 BD **1 Claim**



1. In a telecommunication switching apparatus comprising a central control, a digit interpreter and an exchange repeater, said exchange repeater including means for initiating call-back connections between subscribers connected thereto and holding the connection to the central office subscriber in a waiting position, a method of operation comprising the steps of:

initiating a call-back connection by dialing a special dial code,

disconnecting a holding circuit of a waiting subscriber after initiating said call-back connection,

starting a timing device responsive to said disconnecting step, said timing device determining the period of interruption of the holding circuit and

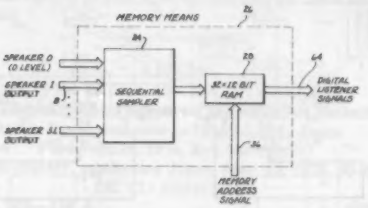
through connecting, under the control of the timing device, a transmission path for data transmission between said telecommunication switching apparatus and a public exchange.

4,059,735

DIGITAL CONFERENCE SYSTEM

William L. Betts, St. Petersburg, Fla., assignor to NCR Corporation, Dayton, Ohio

Filed Nov. 18, 1976, Ser. No. 742,978
Int. Cl.² H04M 3/56
U.S. Cl. 179—18 BC **14 Claims**



1. A digital conference system for providing conference conversations among selected groups of stations in a communications system, said system comprising in combination:

a. a plurality of stations for generating speaker signals and for generating conference control signals, each of said stations responsive to a listener address signal for receiving selected groups of listener output signals;

b. programmable list processor means connected to receive said conference control signals and responsive thereto for generating memory address signals and control signals;

c. memory means connected to receive said speaker signals and for sequentially storing and periodically updating samples of said speaker signals, said memory means also connected to receive said memory address signals and responsive thereto for generating a series of listener output pulses;

d. accumulator means coupled to said memory means and responsive to said control signals for accumulating selected groups of listener output pulses and for generating corresponding groups of listener output signals; and

e. listener address means responsive to said control signals for generating the listener address signals;

whereby, said corresponding listener output signals received by a station are representative of the desired conference conversation to be heard at said station.

4,059,736

DUAL TESTING SYSTEM FOR SUPERVISING DUPLICATED TELECOMMUNICATION EQUIPMENT

Giovanni Perucca; Flavio Melindo, both of Turin, and Girolamo De Vincentiis, San Mauro Torinese, all of Italy, assignors to CSELT - Centro Studi e Laboratori Telecomunicazioni S.p.A., Turin, Italy

Filed June 17, 1976, Ser. No. 697,234
Claims priority, application Italy, June 17, 1975, 68551/75
Int. Cl.² H04M 3/22
U.S. Cl. 179—175.2 R **10 Claims**

1. A dual testing system for supervising the performance of two substantially identical assemblies of telecommunication equipment served by respective sets of ancillary units, comprising:

a pair of mutually independent and substantially identical command sections each comprising a processor programmed to transmit outgoing messages to designated ancillary units of either of said sets and to receive incoming messages from said ancillary units;

a pair of mutually independent and substantially identical monitoring sections each including one of said assemblies and the associated set of ancillary units;

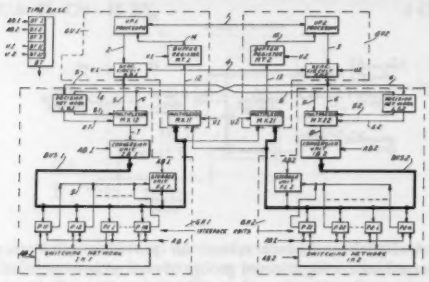
a transmitting path in each of said command sections for outgoing messages originating at the processor thereof, said transmitting path having a pair of parallel outgoing branches each leading to one of said monitoring sections;

a receiving path in each of said command sections for incom-

ing messages destined for the processor thereof, said receiving path having a pair of parallel incoming branches each extending from one of said monitoring sections;

check means connected to said transmitting paths for determining the performance of said processors;

first routing means in each of said monitoring sections for



selectively directing said outgoing messages from either of said processors, under the control of said check means, to designated units in the corresponding set of ancillary units and

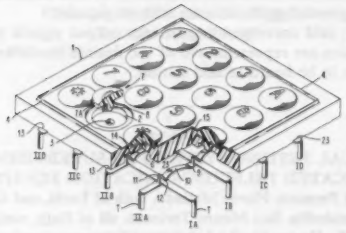
second routing means in said command sections for directing any incoming message from either of said sets of ancillary units to both said processors.

4,059,737

KEYBOARD SWITCH STRUCTURE HAVING MATRIX ARRANGED ELONGATED UNDULATED CONTACTS

Fernand Gergaud, LaGaude, France, assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 3, 1976, Ser. No. 711,323
Claims priority, application France, Aug. 11, 1975, 75.25820
Int. Cl.² H01H *13/70*
U.S. Cl. 200—5 A **3 Claims**



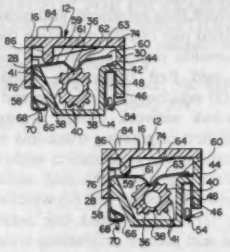
1. A keyboard comprising a support having in its upper surface a plurality of recesses therein arranged as a matrix and having apertures therein which extend through said support, a plurality of keys having upper portions adapted to fit in said recesses and rod portions which extend through said apertures, contact elements arranged as a matrix in the lower portion of said support comprising a first set of parallelly arranged conducting strips and a second set of parallelly arranged conducting strips generally perpendicular to said first set, a conducting strip of said first set and a conducting strip of said second set crossing each other below and laterally to one side of said rod portion of each said key, said conducting strip of said second set having a flexible arcuate portion which engages the lower end of the rod of a key and normally biases said key to its upper position and a second arcuate portion contiguous with said flexible arcuate portion, the juncture between the arcuate portions having a first position which is spaced apart from a conducting strip and a second position which is in contact with the last mentioned conducting strip, said flexible arcuate portion moving downwardly when said key is depressed thereby causing said juncture to move downwardly from one of its aforementioned positions to the other, and means for maintaining said keys in their recesses.

4,059,738

MULTI-POSITION SWITCH ASSEMBLY HAVING PLURAL OPERATOR WITH PRIMARY AND SECONDARY DETENTED CAMS

Roland E. Mongeau, Cumberland, R.I., assignor to Tower Manufacturing Corporation, Providence, R.I.

Filed May 24, 1976, Ser. No. 689,518
Int. Cl.² H01H *19/62, 3/42*
U.S. Cl. 200—6 B **11 Claims**



5. A multi-circuit switch for use with household appliances and the like comprising a housing including a first housing member having opposed upstanding end and opposed upstanding side walls, a rotor journalled at the ends thereof in said end walls and adapted for at least partial rotation with respect to said housing, said rotor intermediate the ends thereof having a plurality of axially spaced circumferential cam tracks, a stationary contact supported along one of said side walls, a plurality of generally parallel resilient switch conductors supported by the other of said side walls at a first end thereof and outwardly extending to means intermediate the ends thereof for contacting said cam track positioned in alignment therewith and terminating in a contact at the other end thereof in position to engage said stationary contact, and a second housing member cooperating with said first housing member to generally enclose said switch, said second housing member including means for contacting upper portions of said conductors intermediate said first end and said cam track contacting means for simultaneously urging said switch conductor contact ends into engagement with said stationary contact, said conductor cam track contacting means serving to hold a plurality of said switch conductor other ends out of contact with said stationary contact at any given time.

4,059,739

ELECTRICAL POWER RECEPTACLE HAVING BUILT-IN SWITCHING CONTACTS

Fahir Girismen, 372 Baldwin Road, Carlisle, Mass. 01741

Division of Ser. No. 467,654, May 7, 1974, Pat. No. 3,974,492.
Filed Aug. 9, 1976, Ser. No. 712,774
Int. Cl.² H01R *33/30*
U.S. Cl. 200—51.09 **1 Claim**

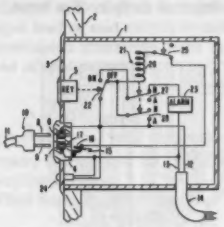
1. In a power receptacle security alarm system for detecting that a power plug to an appliance has been removed from the receptacle, at least an electrical detection terminal on the receptacle in combination with conventional receptacle contacts comprising,

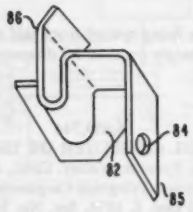
a unitary piece of electrically conductive material including a pad portion and a contact portion,

the pad portion being attached to the bottom of a substantially conventional AC power receptacle,

the contact portion being folded, the free end of the fold extending perpendicular to the pad portion, so that the

free end is in registration with one of the conventional receptacle contacts into which a prong of the AC plug is





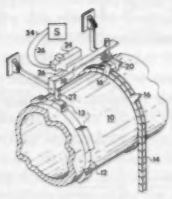
inserted so that said prong contacts the free end and the receptacle contact.

4,059,740

SWITCH AND OPERATING MECHANISM FOR CIRCULAR HOSIERY KNITTING MACHINE SPEED CONTROL

John M. Laughlin, 225 Roseboro Drive, Asheboro, N.C. 27203

Filed Mar. 24, 1976, Ser. No. 669,763
Int. Cl.² H01H *29/00, 35/00;* D04B *35/10*
U.S. Cl. 200—52 R **4 Claims**



1. In combination with a circular hosiery knitting machine, an improved cylinder speed control system of the type having lugs on the pattern chain and/or cams on the cam drum, a vertically reciprocal lever mechanism pivotally mounted to said machine in the path of said lugs and cams and activated in response to engagement by said lugs and cams, a switching mechanism in the path of and operated by said lever mechanism, and a speed control mechanism electrically connected to and operated by electrical pulses from said switching mechanism to shift a drive belt between a slow and fast pulley, wherein said switching mechanism comprises:

a. a housing having an elongated chamber therein and pivotally mounted to said machine for arcuate reciprocal movement between a first position in which one end of said chamber is tilted downwardly and a second position in which said one end is tilted upwardly;

b. a glass encapsulated mercury switch having leads extending therefrom and mounted in said chamber with said leads extending through the other end of said chamber opposite said one end, whereby, when said one end of the chamber is tilted downwardly, the mercury in said switch is out of engagement with the contacts of said leads, and when said one end is tilted upwardly, the mercury is in contact with said leads;

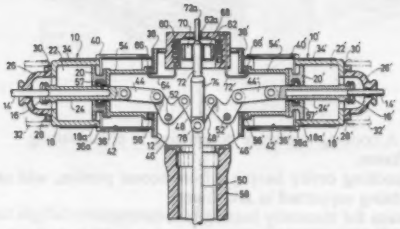
c. said housing including an abutment means thereon, engaged by said lever during operation, for moving said housing between said first and second positions responsive to movement of said lever by said pattern chain and cam drum.

4,059,741

PUFFER TYPE GAS CIRCUIT BREAKER

Yoshio Yoshioka; Kunio Hirasawa, and Masanori Tsukushi, all of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Filed Feb. 24, 1976, Ser. No. 660,787
Claims priority, application Japan, Mar. 10, 1975, 50-28049
Int. Cl.² H01H *33/70*
U.S. Cl. 200—148 A **8 Claims**



1. A puffer type gas circuit breaker comprising:

at least a pair of puffer type breaking units having their movable parts disposed to face each other, each breaking unit including:

at least a pair of contacts capable of being opened and separated from each other, and

a puffer device having a puffer cylinder and a puffer piston,

said puffer device being disposed so that when said contacts are opened and separated, said puffer device compresses an arc-extinguishing gas and blows it to an arc produced between said contacts;

a bracket disposed between said puffer type breaking units;

electrically insulating and supporting means for supporting said bracket in state electrically insulated from ground potential;

linking means mounted on said bracket to transmit an actuating force to each of the movable parts of said puffer type breaking units;

an electrically insulated operating rod for connecting said linking means with operating means disposed at ground potential in the insulated state;

supporting means for supporting each of said puffer type breaking units to said bracket;

insulating connecting means for connecting the movable parts of the puffer type breaking units with said linking means in the insulated state;

an electromagnetic coil attached in the insulated state to said bracket to form a series connecting circuit with each of said puffer type breaking units;

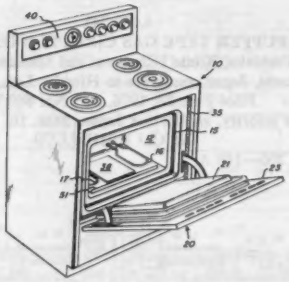
an electromagnetic repulsive member electromagnetically connected to said electromagnetic coil and arranged to actuate said linking means to open said puffer type breaking units in proportion to the intensity of an electric current flowing through said electromagnetic coil;

and current transferring means mounted on said puffer type breaking units to short-circuit said electromagnetic coil at closing positions of said puffer type breaking units and to release the short circuit at the initial stage of the breaking operation.

4,059,742
MICROWAVE SEAL FOR COMBINATION COOKING APPARATUS

David A. Baron, Edina, Minn., assignor to Litton Systems, Inc., Beverly Hills, Calif.

Filed July 9, 1975, Ser. No. 594,526
Int. Cl.[2] H05B 9/06
U.S. Cl. 219—10.55 D 15 Claims



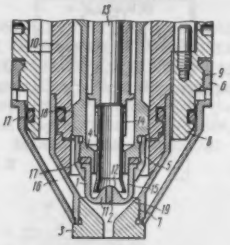
1. A cooking appliance comprising in combination:
a frame;
a cooking cavity having a front access portion, said cavity being supported in said frame;
means for thermally heating said cavity;
means providing microwave energy to said cavity at a preselected frequency;
a door mounted on said frame adapted for movement between an open and a closed position and including an interior face portion, said interior face portion substantially covering said front access portion of said cavity when said door is in the closed position;
said door including means defining an annular chamber extending around the periphery of said front access portion when said door is closed, said chamber including an entrance portion located outside of and faced away from said cavity, said entrance portion being spaced away from said interior face portion a distance approximately equal to one-half wavelength of the microwave energy at said preselected frequency, said chamber having a dimension measured from said entrance portion of the rear wall of said chamber approximately equal to one-fourth wavelength of the microwave energy at said preselected frequency.

4,059,743
PLASMA ARC CUTTING TORCH

Eduard Migranovich Esibian, ulitsa Kikvidze, 4, kv. 21; Daniil Andreevich Dudko, ulitsa Anri Barbjusa, 22-26, kv. 113; Mikhail Evgenievich Danchenko, Bulvar Likhacheva, 3, kv. 53; Vasily Berkovich Malkin, prospekt Voroshilova, 31, kv. 305, and Valery Andreevich Kozhema, ulitsa Dovnar-Zapolskogo, 6, kv. 59, all of Kiev, U.S.S.R.

Filed Oct. 6, 1975, Ser. No. 619,701
Int. Cl.[2] B23K 9/00
U.S. Cl. 219—121 P 9 Claims

1. A plasma torch comprising an electrode which has a diameter selected to suit an arc current and which has a side surface and a flat end face whose diameter is selected to be in the range of approximately 0.4 – 0.5 of the electrode diameter, said side surface and said flat end of said electrode mating with each other through a portion which is a part of the external surface of a torus; and a nozzle which has a flat end face and an internal surface having cylindrical and tapering portions, said cylindrical portion having a length selected to correspond to the arc current and adjoining said nozzle flat end face, said tapering portion facing said flat end face of said electrode, said tapering and cylindrical portions being mated with each other along a radius that is substantially equal to the length of said cylindrical portion of the internal surface of said nozzle so as to make a part of the internal surface of a torus, and said flat

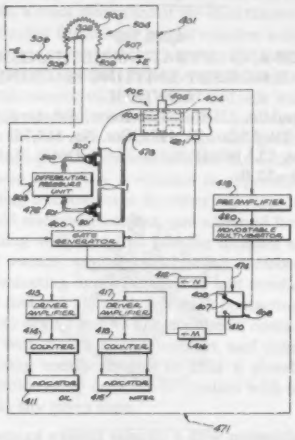


electrode end face being spaced from said nozzle end face at a distance approximately equal to 1.5 diameters of said electrode flat end face.

4,059,744
NET OIL COMPUTER OR THE LIKE

Peter P. Elderton, Fountain Valley, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Dec. 8, 1976, Ser. No. 748,459
Int. Cl.[2] G06M 3/08; G01N 11/00
U.S. Cl. 235—92 FL 6 Claims



1. A net oil computer or the like for producing an output directly proportional to the total mass or volume flow of at least one of first and second fluids flowing as a mixture in a pipeline, said computer comprising: first means having an output lead and connected with the pipeline for producing first pulses on said first means output lead at a pulse repetition frequency directly proportional to the volume rate of flow of both fluids in said pipeline; second means connected with the pipeline for producing an output directly proportional to the difference in pressures at two different elevations in the pipeline in which the mixture of the first and second fluids can flow; third means for producing an output directly proportional to the density of the first fluid; fourth means for producing an output directly proportional to the density of the second fluid; a switch having first input lead connected from said first means output lead to receive said first pulses, said switch having at least one output lead, said switch having a second input lead and being electrically operable upon receipt of a pulse on said second input lead to change the connection between the

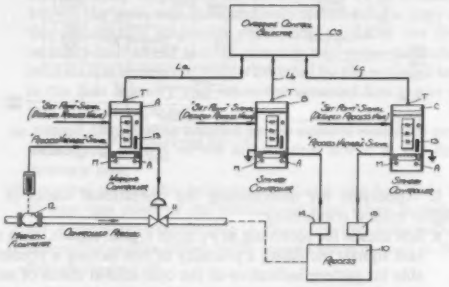
first input and the output lead of said switch; and fifth means connected from said second, third and fourth means to receive the outputs thereof and adapted to impress second pulses on the second input lead of said switch to cause first pulses to be passed and interrupted alternately from the first input lead to the output lead of said switch.

4,059,745

OVERRIDE PROCESS CONTROL SYSTEM

Max H. Gaertner, Warminster, Pa., assignor to Fischer & Porter Co., Warminster, Pa.

Filed Sept. 29, 1976, Ser. No. 727,667
Int. Cl.[2] G05B *11/01*
U.S. Cl. 364—108 9 Claims



1. An override process control system for regulating a process from a single final control element from at least two process variables that are interdependent and must not exceed safe minimum and maximum limits, the first process variable being directly influenced by the setting of the final control element, said system comprising:

A. a primary electronic process controller responsive to the first process variable to compare this variable with a first set point to produce in a non-override mode a first output signal that reflects the deviation of the first process variable from the set point and is applied to said final control element to govern this element accordingly;

B. a standby electronic process controller responsive to the second process variable to compare this variable with a second set point to produce in the non-override mode a second output signal that reflects the deviation of the second process variable from the set point, which second signal under certain conditions may assume an unsafe value to produce an unsafe signal; and

C. an override control selector station coupled by individual lines to said controllers to monitor the operations thereof, and in the event an unsafe signal is received from the standby controller, to cause said controllers to operate in an override mode in which the primary controller responds to the unsafe signal from the standby controller to govern the final control element accordingly.

4,059,746

PULSE DISTRIBUTION APPARATUS FOR LINEAR INTERPOLATION IN A NUMERICAL CONTROL SYSTEM

Kyosuke Haga, Anjo, Japan, assignor to Toyoda-Koki Kabushiki-Kaisha, Japan

Filed Dec. 29, 1976, Ser. No. 755,140
Claims priority, application Japan, Feb. 25, 1976, 51-20338
Int. Cl.[2] G05B *19/28*
U.S. Cl. 364—107 7 Claims

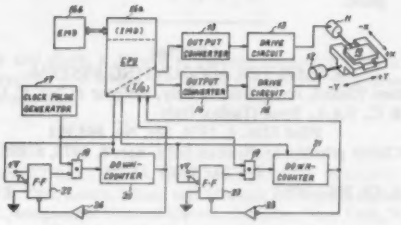
1. A pulse distribution apparatus for distributing drive pulses to drive a plurality of servomechanisms in a numerical control system to thereby displace a movable member along a line segment to be linearly interpolated, comprising:

a digital computer connected with said servomechanisms;

a clock pulse generator for generating clock pulses at a predetermined frequency;

a plurality of presettable counter means each respectively associated with one of said plurality of servomechanisms and each connected to said digital computer to receive a preset value therefrom and to said clock pulse generator to receive said clock pulses for generating an output command to said digital computer when receiving said clock pulses corresponding in number to said preset value therein; and

gate means respectively connected between said counter means and said clock pulse generator for inhibiting the transmitting of said clock pulses to the corresponding counter means when the same generates said output command;



said digital computer including:

means for calculating from numerical control data the time which is required for said movable member to travel over the entire length of said line segment at a commanded feed rate,

means for calculating periods for pulse distribution cycles for said respective servomechanisms, each of said cycles being determined to assign within said required time all of pulses to be distributed to one of said axes relating thereto, and

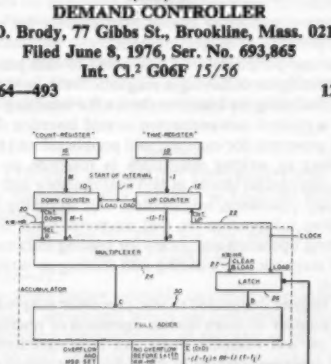
means for distributing one drive pulse to one of said servomechanisms and for supplying the value of the period of one of said distribution cycles for said one servomechanisms as said preset value to one of said counter means each time the same generates said output command.

4,059,747

DEMAND CONTROLLER

Mitchell D. Brody, 77 Gibbs St., Brookline, Mass. 02146

Filed June 8, 1976, Ser. No. 693,865
Int. Cl.[2] G06F *15/56*
U.S. Cl. 364—493 12 Claims



1. A system for controlling a load means to forecast power consumption and maintain the total electrical power demand below a predetermined peak value, said system comprising;

first counting means operated by kilowatt-hour pulses for continuously registering a count corresponding to the number of kilowatt-hour pulses needed to reach a target count indicative of a peak demand count,

means for generating clock pulses,

second counting means operated by said clock pulses for continuously registering a count corresponding to the time remaining in the demand interval,

accumulator means,

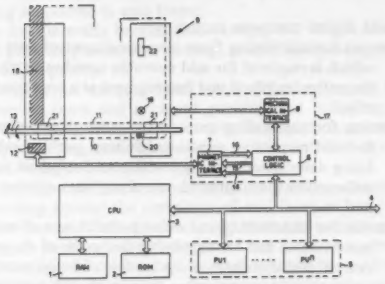
and selector means responsive to said kilowatt-hour pulses and said clock pulses and including means for loading the contents of the second counting means into the accumulator means and means for thereafter combining the contents of the first counting means with the contents of the second counting means upon the occurrence of each clock pulse.

4,059,748

COMPUTER ACCOUNTING SYSTEM

Ettore Violino, Ivrea (Turin), Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy

Filed Mar. 4, 1976, Ser. No. 663,951
Claims priority, application Italy, Apr. 8, 1975, 67888/75
Int. Cl.[2] G06F *11/00*
U.S. Cl. 235—303.1 **4 Claims**



1. A computerized accounting system for reading and writing information comprising:

a first memory for storing microinstructions arranged in a plurality of microprograms;

a processor connected to said first memory for processing said plurality of microprograms;

at least one peripheral unit connected to said processor for processing cards having a magnetic track, said peripheral unit including an insertion device for handling said cards and a control unit connected to said insertion device and said processor for enabling said peripheral unit to perform reading or writing operations in response to particular microprograms stored in said first memory and processed by said processor, said control unit including means for writing information on said magnetic track during said writing operation and means for reading information from said magnetic track during said reading or writing operations;

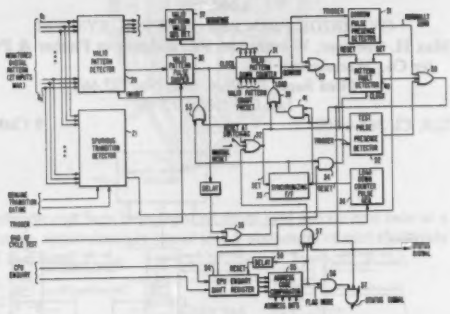
a first register connected to said processor adapted to record the number of times that an operation of reading or writing on said magnetic track has been executed, wherein said processor comprises error detecting means responsive to said reading means for detecting reading or writing errors in said magnetic track during said reading or writing operations and repeating means responsive to the contents of said first register and said error detecting means for repeating the operation until either the operation is performed without an error being detected or said first register indicates that the operation has been repeated a predetermined number of times.

4,059,749

DIGITAL MONITOR

Michal M. Fellchenfeld, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 9, 1976, Ser. No. 740,280
Int. Cl.[2] G06F *11/00*
U.S. Cl. 235—302 **5 Claims**



1. Apparatus for determining the operational status of a digital system comprising:

a. first means for receiving as an input digital signals, each of said signals including a plurality of bits having a predictable bit pattern indicative of the operational status of said digital system, and for generating in response thereto a pattern fault signal for each of said digital signals having an unexpected bit pattern;

b. second means for receiving as an input said digital signals and for in response thereto generating an error signal for each pattern found to be in an unexpected sequence; and

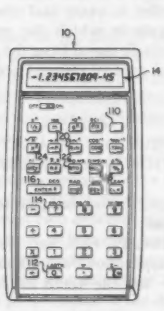
c. third means for combining said pattern fault and said error signals to generate a composite status signal indicative of the operation status of said digital system.

4,059,750

GENERAL PURPOSE CALCULATOR HAVING SELECTIVE DATA STORAGE, DATA CONVERSION AND TIME-KEEPING CAPABILITIES

Peter D. Dickinson, Monte Sereno; Thomas E. Osborne, San Francisco; France Rode, and Allen J. Baum, both of Los Altos, all of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Continuation of Ser. No. 364,570, May 29, 1973, abandoned.
This application Apr. 8, 1975, Ser. No. 566,143
Int. Cl.[2] G06F *13/00*
U.S. Cl. 364—715 **8 Claims**



1. An electronic calculator comprising:

an input unit including a plurality of manually operable keys having key codes assigned thereto for entering information into, and initiating mathematical operations per-

formed by, the calculator, said plurality of keys including a class of numeric and non-numeric keys having unique key codes assigned thereto;

a first memory unit coupled to the input unit for storing information received therefrom and for storing results of operations performed by the calculator;

a second memory unit coupled to the first memory unit for storing information received therefrom;

a processing unit having arithmetic means coupled to the input and first memory units for executing mathematical operations performed by the calculator employing the information or results stored in the first memory unit and storing the results of executed operations in the first memory unit, and having control means coupled to the input, first and second memory units, said control means being automatically responsive to the key code of an actuated key on the input unit for selectively transferring a copy of the information or results previously stored in the first memory unit to the second memory unit prior to storing information entered or results initiated by the actuated key in the first memory unit when the actuated key is one of said class of keys; and

an output display unit coupled to the control means to provide visual display of the information stored in the first memory unit;

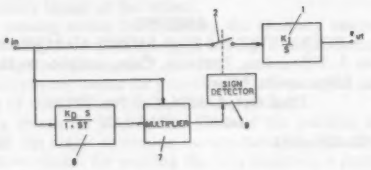
the control means also being responsible to the key code of at least one other of the plurality of keys when actuated for selectively transferring a copy of the information entered or results stored in the second memory unit to the first memory unit.

4,059,751

LOGIC CONTROLLED INTEGRATOR

Sven Willner Eriksson, Karlskoga, Sweden, assignor to AB Bofors, Bofors, Sweden

Filed Sept. 29, 1975, Ser. No. 617,557
Claims priority, application Sweden, Oct. 21, 1974, 7413199
Int. Cl.² G06G *7/18*
U.S. Cl. 364—829 **3 Claims**



1. A control system including an integrator controlled by a logic circuit comprising:

an integrator having an input terminal,

switching means for at times connecting an input signal *e* to said integrator input terminal,

logic means driven by said input signal *e* for controlling said switching means to connect said input signal *e* to said integrator input terminal, said logic means including a derivative circuit to produce the derivative $\dot{e}$ of said input signal and in which said logic means forms the product of $e \cdot \dot{e}$.

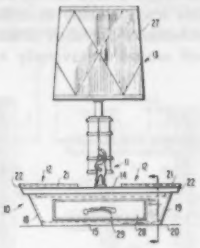
4,059,752

TROPHY LAMP

James Henry Pickett, Jr., 1362 Otis Place, NW., Washington, D.C. 20010

Filed Jan. 9, 1976, Ser. No. 647,879
Int. Cl.² F21V *33/00*; A47B *17/04*
U.S. Cl. 362—98 **6 Claims**

1. A trophy lamp comprising a base, a three-dimensional trophy supported fixedly upon said base, a receptacle fixedly supported by said base for displaying a sheet commemorative of the award of said trophy comprising a picture frame having a removable transparent cover, a source of illumination comprising an ornamental pedestal lamp mounted behind said trophy supported by said base and positioned to illuminate said



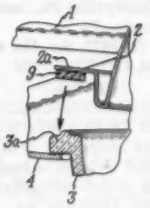
trophy and sheet, a drawer to receive mementos relating to said trophy, and means for slidably receiving said drawer within said base.

4,059,753

GASKET MATERIAL AND METHOD OF MAKING

David K. Tart, Lenox, Mass., and Mitchell M. Osteen, Zirconia, N.C., assignors to General Electric Company, New York, N.Y.

Filed Apr. 25, 1974, Ser. No. 463,898
Int. Cl.² F21S *13/10*
U.S. Cl. 362—267 **5 Claims**



1. In a luminaire, an optical system comprising a reflector and a light transmitting closure defining a closed optical enclosure, means for mounting a lamp in said enclosure, and a gasket arranged between and compressed by said reflector and said light transmitting closure, said gasket formed of felt material comprising synthetic resin fibers which have been heated at a temperature of about 130° C – 230° C for a sufficient time to appreciably increase the compression recovery thereof.

4,059,754

LOUVER FOR LIGHT DISTRIBUTION

Ian Lewin, Scottsdale, Ariz., assignor to American Louver Company, Skokie, Ill.

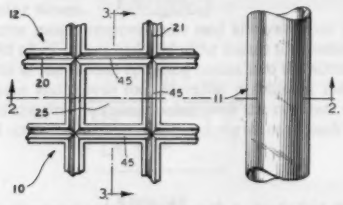
Filed Jan. 12, 1976, Ser. No. 648,036
Int. Cl.² F21S *1/06*
U.S. Cl. 362—217 **4 Claims**

1. In a lighting fixture assembly including an elongated lamp surmounting a louver unit which has first vertically orientated blades extending longitudinally of the axis of the elongated lamp and second vertically orientated blades extending transversely of the axis of the elongated lamp whereby said blades form a plurality of cells between opposed side surfaces of said blades and the cells are open from the upper surfaces of the blades to the lower surfaces thereof, the improvement comprising:

a. in at least a substantial majority of the cells, the opposed side surfaces on said first blades each having at least a portion thereof curved about a horizontal axis,

b. in said cells the opposed side surfaces on said second blades each having at least a portion thereof curved about a horizontal axis,

c. the radius of curvature of said curved surface portion on each of said first longitudinally extending blades being smaller than the radius of curvature of said surface portion on each of said second transversely extending blades



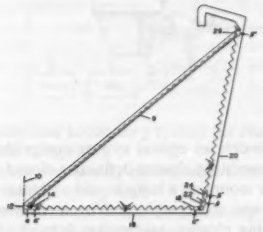
whereby light rays emitted from said elongated lamp longitudinally thereof strike said second transversely extending blades and are reflected at a greater angle to the vertical than light which is emitted transversely of said elongated lamp and strikes said side surfaces of said first longitudinally extending blades to provide a substantially uniform light effect.

4,059,755

LUMINAIRE LENS INSERT

Grafton K. Brabson, Quarryville, Pa., assignor to Armstrong Cork Company, Lancaster, Pa.

Filed Dec. 29, 1975, Ser. No. 644,754
Int. Cl.² F21V 5/04
U.S. Cl. 362—224 **2 Claims**



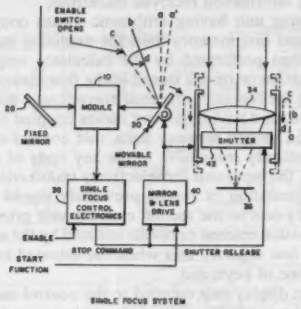
1. An elongated luminaire for illuminating an area therebelow comprising a linear light source, an elongated primary prism having a bottom section formed with a series of parallel prisms extending from the center of the bottom section of the luminaire to the edge of the luminaire, said prisms having an included angle fixed in size and an included angle which increases in size as one progresses from the centermost prism to the edgemost prism of the bottom section, said prisms being formed on the sides thereof facing the light source, said prisms constituting light incident and light emergent surfaces for redirecting and emitting light rays from the light source generally away from a vertical plane passing through the axis of the linear light source and into annular ranges on either side thereof, and a lens insert means between the light source and the primary prism, said lens insert having prisms on the side thereof facing away from the light source, the distribution of light from both the primary prism and lens insert being such that substantially half of the light distribution will emit in an area of 0° to 30° from the vertical plane and substantially the other half of the light is distributed in an area from 30° to 60° from the vertical plane, and the light actually is distributed in two zones either side of the vertical plane.

4,059,756

FOCUS CONTROL SYSTEM WITH DUAL SCAN

Dennis J. Wilwerding, Littleton, Colo., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Oct. 1, 1976, Ser. No. 728,566
Int. Cl.² G01U 1/20
U.S. Cl. 250—201 **42 Claims**



1. An optical system comprising:

lens means for providing a primary image of an object;

scanning means for providing first and second scans of an auxiliary image of the object;

range sensing means for receiving the auxiliary image and providing a correlation signal having a major extremum in each scan indicative of the distance to the object;

extremum sensing means for receiving the correlation signal and providing an output signal which changes from a first to a second state only once during the second scan;

lens drive means for moving the lens means in a predetermined relationship with the scanning means during the second scan; and

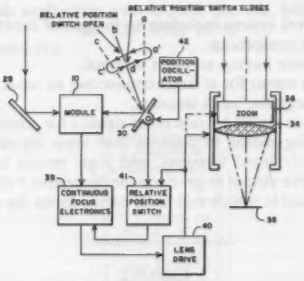
focus control means for halting motion of the lens means in response to the change of state of the output signal.

4,059,757

FOCUS SYSTEM FOR MOVIE CAMERAS

Dennis J. Wilwerding, Littleton, Colo., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Oct. 1, 1976, Ser. No. 728,567
Int. Cl.² G01J 1/20
U.S. Cl. 250—201 **35 Claims**



1. An optical system comprising:

lens means for providing a primary image of an object.

scanning means for providing a plurality of scan cycles, each scan cycle comprising first and second scans of an auxiliary image of the object;

range sensing means for receiving the auxiliary image and providing a correlation signal having a major extremum in each scan indicative of the distance to the object;

extremum sensing means for receiving the correlation signal

and providing an output signal which changes from a first to a second state only once during the second scan;

relative position sensing means for producing a position signal having a third state when the scanning means and the lens means have a first positional relationship and having a fourth state when the scanning means and the lens means have a second positional relationship;

focus control means for producing a position correction signal which is a function of the state of the position signal when the output signal changes from the first to the second state during the second scan; and

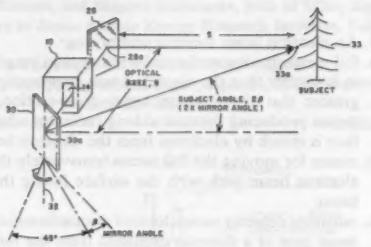
lens drive means for positioning the lens means in response to the position correction signal.

4,059,758

AUTOFOCUS SYSTEM

Dennis J. Wilwerding, Littleton, Colo., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Oct. 7, 1976, Ser. No. 730,489
Int. Cl.[2] G01J *1/20*
U.S. Cl. 250—201 13 Claims



1. An optical system comprising:

lens means for providing a primary image of an object;

scanning means for providing first and second scans of an auxiliary image of the object;

range sensing means for receiving the auxiliary image and providing a correlation signal having a major extremum during the first scan;

position sensing means for providing a position signal indicative of the position of the scanning means;

storing means for storing the value of the position signal when the major extremum occurs during the first scan;

lens drive means for moving the lens means in a predetermined relationship with the scanning means during the second scan; and

focus control means for halting motion of the lens means during the second scan when the position signal attains the value stored by the storing means.

4,059,759

PASSIVE AND ACTIVE PULSE STACKING SCHEME FOR PULSE SHAPING

Robert C. Harney, Livermore, and John F. Schipper, Palo Alto, both of Calif., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed May 25, 1976, Ser. No. 689,766
Int. Cl.[2] H01J *39/12;* G02B *27/10;* G02F *1/01, 1/03*
U.S. Cl. 250—206 38 Claims

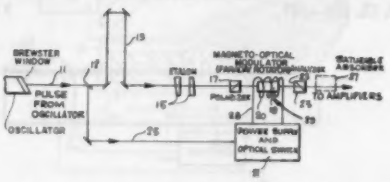
1. Apparatus for producing, from a pulsed beam of light, a sequence of light pulses with a pulse envelope of controllable time variation, the apparatus comprising:

at least two partially transmissive reflective means, spaced apart and positioned to intercept the beam, for producing a sequence of light pulses in response to the original pulse;

means for linearly polarizing the radiation;

analyzer means, with the direction of linear polarization oriented at a fixed angle relative to the polarization direction of the polarizer means and positioned to receive the light transmitted by the polarization means, for transmitting only that component of polarized radiation oriented along the polarization direction of the analyzer means;

a magneto-optical modulator positioned intermediate between the polarizer means and the analyzer means;



power supply and optical switch means for externally producing a controllable, time-varying electromagnetic signal at the magneto-optical modulator in response to receipt of a portion of the incoming beam of light; and

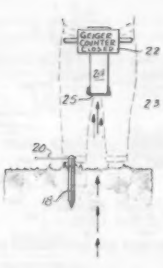
pulse directing means for directing a portion of the incoming light beam into the power supply and optical switch means.

4,059,760

GEORADIOLOGICAL SURVEYING FOR OIL AND GAS AND SUBSURFACE STRUCTURE CONTOUR MAPPING

John A. Murphy, 920 E. 36th Place, Tulsa, Okla. 74105

Continuation-in-part of Ser. No. 525,002, Nov. 18, 1974, abandoned. This application July 6, 1976, Ser. No. 702,607
Int. Cl.[2] G01V *5/00*
U.S. Cl. 250—253 2 Claims



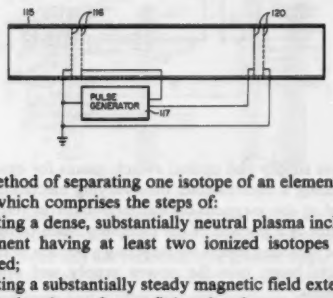
1. A prospecting system using georadiograph techniques comprising the steps of selecting an area to be surveyed, subdividing the area into a plurality of equal squares, placing an identifying check point number at each corner and also in the center of each of the squares, measuring with a geiger counter the background radiation at each check point from a point spaced above the ground with the geiger counter receiving tube closed, measuring with a geiger counter the ground level radiation at each check point with the geiger counter receiving tube open and pressed flat against the ground, subtracting the two measurements to determine if there has been a reduction in radiation as said radiation passed through the earth, and using these subtracted radiation figures to plot a contour georadiograph map of the area.

4,059,761

SEPARATION OF ISOTOPES BY TIME OF FLIGHT

John Myrick Dawson, Pacific Palisades, Calif., assignor to TRW Inc., Redondo Beach, Calif.

Division of Ser. No. 562,993, March 27, 1975. This application Feb. 17, 1976, Ser. No. 658,566
Int. Cl.[2] H01J 39/24
U.S. Cl. 250—287 3 Claims



1. The method of separating one isotope of an element from the others which comprises the steps of:

a. generating a dense, substantially neutral plasma including an element having at least two ionized isotopes to be separated;

b. generating a substantially steady magnetic field extending through the plasma for confining the plasma;

c. imparting more energy to a selected isotope than to the other isotopes while the element is in the magnetic field by subjecting the isotopes to a pulsed electric accelerating field; and

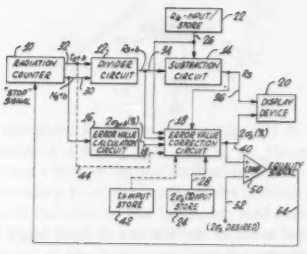
d. subsequently separating the accelerated isotopes by their differential time of flight due to their different velocity corresponding to their different mass.

4,059,762

METHOD AND APPARATUS FOR DETERMINING ACCURACY OF RADIATION MEASUREMENTS MADE IN THE PRESENCE OF BACKGROUND RADIATION

Donald L. Horrocks, Placentia, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Filed May 17, 1976, Ser. No. 686,973
Int. Cl.[2] G01T 1/20
U.S. Cl. 250—336 10 Claims



1. A method of determining the accuracy of a measurement of radioactivity of a sample alone when taken in the presence of background radiation, said method comprising the steps of:

measuring the background radiation alone;

measuring radiation from the sample in the presence of said background radiation;

determining error values respectively related to said measuring steps;

determining the radiation attributable to the sample alone, by subtracting the result of said first-mentioned measuring step from the result of said second-mentioned measuring step; and

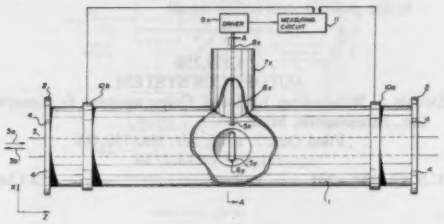
determining the accuracy of the result of said last-mentioned step by combining the error values related to said measuring steps.

4,059,763

ELECTRON BEAM CURRENT, PROFILE AND POSITION MONITOR

Edward A. Heighway; Kenneth J. Hohban, and Stanley O. Schriber, all of Deep River, Canada, assignors to Atomic Energy of Canada Limited, Ottawa, Canada

Filed Nov. 30, 1976, Ser. No. 746,133
Claims priority, application Canada, Mar. 2, 1976, 246958
Int. Cl.[2] G01T 1/16
U.S. Cl. 250—336 10 Claims



1. An electron beam monitor comprising:

a. foil means having surface of width w_1 and length l_1 where w_1 is smaller than the electron beam cross-section and l_1 is greater that the electron beam cross-section, said foil means producing bremsstrahlung radiation when the surface is struck by electrons from the electron beam;

b. means for moving the foil means transversely through the electron beam path with the surface facing the electron beam;

c. radiation detector means located circumferential about the beam path at a distance displaced from the foil means in the direction of beam travel for detecting radiation from the foil means produced by the electron beam; and

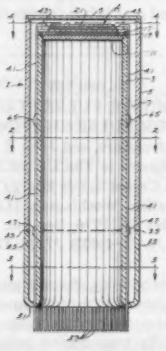
d. means for measuring the intensity of the radiation detected as a function of the position of the foil means in the beam path.

4,059,764

MULTI-ELEMENT INFRA RED SENSORS

Melvin Belasco, Dallas, and Billie Joe Cottongim, Richardson, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Aug. 13, 1968, Ser. No. 752,196
Int. Cl.[2] G01J 1/00
U.S. Cl. 250—352 11 Claims



1. A multi-element infra-red sensor comprising a glass Dewar tube having a tubular glass core open at one end and closed by a metallic plug at the other and a jacket surrounding the core with a space therebetween, said space being evacu-

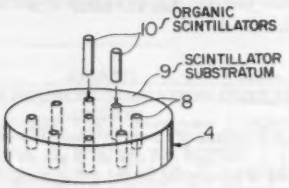
ated, the jacket extending beyond the closed end of the core and having an infra-red transmitting window at its end beyond the closed end of the core, a printed circuit member on the closed end of the core, said member having a face toward said window and a pattern of electrically conductive leads printed on its said face including a generally central common lead, an array of infra-red sensing elements on said common lead in ohmic connection therewith, said pattern further comprising a plurality of printed leads, one for each sensing element, radiating out toward the margin of said member from points adjacent but spaced from said common lead and having their outer ends spaced at intervals around said margin, electrical interconnections between said sensing elements and the inner ends of said radiating printed leads, and means extending longitudinally of the core from the outer ends of said radiating printed leads and from said common lead for interconnecting each sensing element in an electrical circuit with terminals on the outside of the Dewar tube.

4,059,765

GAMMA-RAY SCINTILLATION DETECTOR

Hatsumi Tatsuta, and Shigeru Kumazawa, both of Mito, Japan, assignors to Japan Atomic Energy Research Institute, Tokyo, Japan

Filed Apr. 14, 1976, Ser. No. 676,803
Claims priority, application Japan, Apr. 24, 1975, 50-49996
Int. Cl.² G01T *1/20*
U.S. Cl. 250—367 **2 Claims**



1. A γ-ray scintillation detector for measuring radiation dose rate comprising:

a scintillator substratum provided with a plurality of independent scintillators,

a photomultiplier tube facing the scintillator substratum, and

a light shielding shutter locating between the scintillator substratum and the photomultiplier, the opening of said shutter through which light passes through being adjustable.

4,059,766

DEVICE FOR VISUALIZING DATA PRESENTED IN THE FORM OF RADIANT ENERGY

Henri Rougeot, Paris, France, assignor to Thomson-CSF, Paris, France

Filed Dec. 6, 1976, Ser. No. 747,791
Claims priority, application France, Sept. 12, 1975, 75.37663
Int. Cl.² G01T *1/22*
U.S. Cl. 250—370 **17 Claims**

1. A device for the visualisation of data presented in the form of radiant energy, comprising:

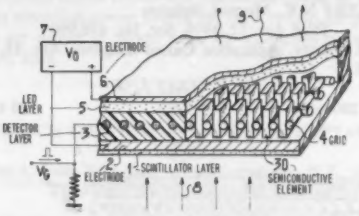
a first layer which receives said incident radiant energy and which releases photons, the number of which is dependent at any point upon the intensity of said incident radiation;

a detector layer, formed by a mosaic of semiconductor elements receiving said photons and which release electrical charge carriers;

a conductive grid, arranged in such a way that each of said semiconductor elements is accommodated in a mesh of said grid and is in electrical contact therewith;

means for biasing said grid and said detector layer to produce a spatial distribution of electrical charges, representing said incident radiation, on that surface of said detector layer which is opposite said first layer;

means for visualising said distribution of charges.

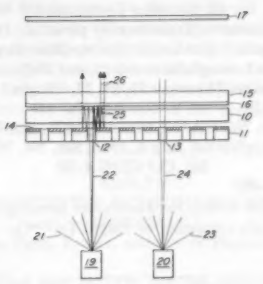


4,059,767

BACK-ILLUMINATED TRANSPARENCY CONTRAST ENHANCEMENT SYSTEM

Albert Macovski, Menlo Park, Calif., assignor to Maxim Diagnostic Imaging, Palo Alto, Calif.

Filed Dec. 27, 1976, Ser. No. 747,424
Int. Cl.² G01N *21/38*; G02B *21/06*
U.S. Cl. 250—461 R **21 Claims**



1. Apparatus for enhancing the contrast of a transparency as seen by a viewer comprising:

ans aperture structure in substantial contact with the nonviewing side of the transparency having an array of transparent regions and having a light converter surface in the non-transparent regions for converting invisible light to visible light;

a reflective means having a reflective surface in substantial contact with the viewing side of the transparency; and

means for transmitting a first light component which is invisible to the viewer through the array of transparent regions and, after passing through the transparency, is reflected by the reflective means back through the transparency to the converter surface where it is converted into visible light which is transmitted through the transparency and the reflective means whereby the viewer sees a contrast enhancement of the transparency.

4,059,768

RADIOGRAPHIC INTENSIFYING SCREENS

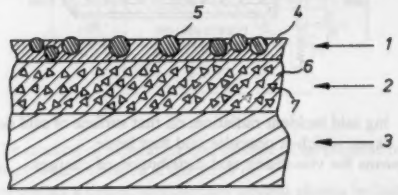
Willy Karel Van Landeghem, Sint-Gillis-Waas, and André Roger Suys, Kalmthout, both of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

Filed Apr. 12, 1976, Ser. No. 675,990

Claims priority, application United Kingdom, Apr. 15, 1975, 15510/75

Int. Cl.[2] G01J 1/58

U.S. Cl. 250—483 15 Claims



1. Fluorescent X-ray image intensifying screen comprising discrete particles of fluorescent material dispersed in a binder layer which screen has an outermost layer overlaying said binder layer containing solid particulate material protruding from a coherent film-forming organic binder medium and having a static friction coefficient at room temperature not higher than 0.50 on steel.

4,059,769

STARTING MATERIAL RADIATION SOURCE FOR MOSSBAUER INVESTIGATIONS OF TELLURIUM COMPOUNDS

Anatoly Julianovich Alexandrov, ulitsa Butlerova, 10, kv. 112, Moscow; July Sergeevich Grushko, ulitsa Koli Podryadchikova, 16, kv. 40, Gatchina Leningradskoi oblasti; Evgeny Fredovich Makarov, Trubnikovsky pereulok, 11, kv. 3, Moscow; Konstantin Yakovlevich Mishin, ulitsa Kirgetova, 23, kv. 73, Gatchina Leningradskoi oblasti, and Daljus Antanas Jono Baltrunas, ulitsa Zhirmunu 17, kv. 27, Vilnjus Litovskoi SSR, all of U.S.S.R.

Division of Ser. No. 554,705, March 3, 1975, Pat. No. 4,004,970. This application July 6, 1976, Ser. No. 702,617

Int. Cl.[2] G21G 4/00

U.S. Cl. 250—493 3 Claims

1. A radiation source for Mossbauer investigations of tellurium compounds consisting of $5MgO.Te^{125m}O_3$.

4,059,770

UNINTERRUPTIBLE ELECTRIC POWER SUPPLY

Robin Mackay, Palos Verdes Peninsula, Calif., assignor to The Garrett Corporation, Los Angeles, Calif.

Filed Oct. 15, 1974, Ser. No. 514,728

Int. Cl.[2] H02K 7/18

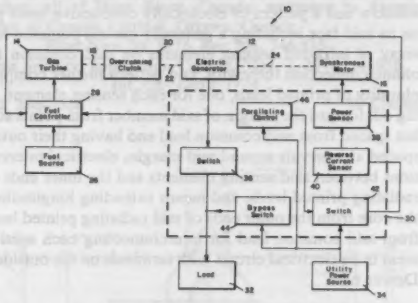
U.S. Cl. 290—4 C 14 Claims

1. A combination comprising:

an electric generator;

first and second mover means connected to simultaneously drive said generator; and

means connected for proportioning motive energy to said first and second mover means to maintain generator output frequency constant, and responsive to disability of said first mover means to disengage said first mover means and maintain generator output frequency constant with said second mover means, and responsive to disability of said second mover means to disengage said second mover means and maintain generator output frequency constant with said first mover means.



4,059,771

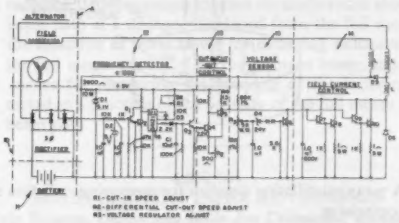
WIND ELECTRIC PLANT WITH IMPROVED ALTERNATOR FIELD EXCITATION

Marcellus L. Jacobs, and Paul R. Jacobs, both of Rte. 11, Box 722, Fort Myers, Fla. 33901

Filed Nov. 5, 1975, Ser. No. 628,952

Int. Cl.[2] H02P 9/04

U.S. Cl. 290—44 6 Claims



1. In a wind electric plant of the type including a wind driven propeller or the like supported at the top of a tower and connected to drive an alternator supported on the tower to generate electrical energy, and storage battery means connected to be charged by the alternator, the improvement comprising: electrical control circuit means connecting the storage battery means with the field winding of the alternator to supply a substantially constant current to the field winding at substantially all speeds of operation of the wind electric plant within a predetermined range of speeds to excite the field of the alternator and thus obtain full excitation of the alternator field at substantially all speeds of operation of the wind electric plant within said range.

5. A wind electric plant as in claim 1, wherein said electrical control circuit means includes a frequency detector connected with the alternator output to sense the frequency of the alternator and develop a signal representative thereof, a switching means connected with the frequency control means to receive the signals therefrom and operative in response thereto to develop output pulses representative of a predetermined frequency range, a normally disabled field current control means connected with the output of the switching means to receive the signals therefrom and enabled in response to the signals, a rectifier connected with the output of the alternator to rectify the alternating current alternator output, and a voltage sensor connected to receive the rectified output and including means to sense the charging voltage applied to the battery means and operative to develop an output signal in response thereto, said

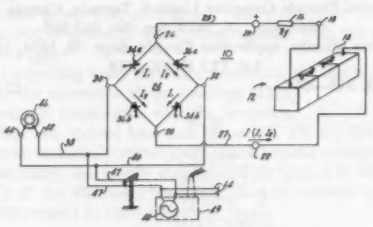
voltage sensor output connected with the field current control means to regulate the amount of current applied to the field of the alternator to thus prevent excessive battery voltage.

6. A wind electric plant as in claim 5, wherein the frequency detector includes a zener diode connected across the input thereto from the alternator to limit the input to a maximum swing of five volts, a pair of transistors connected to receive the limited input, and having their output connected to an integrated circuit chip which develops a fixed amplitude pulse in response to pulses developed by revolution of the alternator, a variable resistor connected with the integrated circuit to vary the width of the pulses developed thereby, and a storage capacitor connected with the output of the integrated circuit to receive the pulses and store them to obtain an average voltage across the capacitor proportional to the number of pulses per minute of the alternator, a second pair of transistors connected with the capacitor and triggered upon discharge of the capacitor, one of the transistors of said second pair having a threshold selected such that it is turned on when the voltage across the capacitor exceeds a given RPM equivalent of the alternator, and connected to turn the other transistor of said pair of transistors off, thus enabling current flow to the bases of four additional transistors connected together to form two identical series current regulators operated in parallel, and a variable resistor connected across the terminals of the battery and having a tap therefrom connected through a zener diode to the base of a further transistor, whereby when the voltage at the tap of the variable resistor exceeds the value of the zener diode, the further transistor is turned on, said further transistor being shunted across the series current regulators to reduce the field control current available to the field winding of the alternator to thereby prevent any further increase in charging voltage to the battery.

4,059,772
WASTE ENERGY SOURCE UTILIZATION CIRCUIT AND METHOD

Alan W. Wilkerson, 410 Madero Drive, Thiensville, Wis. 53092

Filed Feb. 27, 1976, Ser. No. 662,129
The portion of the term of this patent subsequent to Mar. 23, 1993, has been disclaimed.
Int. Cl.[2] F03G *7/08*; H02J *3/40*
U.S. Cl. 307—46 78 Claims



1. A waste energy utilization circuit for energizing an a.c. load coupled to a.c. power mains from a source of waste energy occurring as a by-product of man's activities, said waste energy being applied to said circuit in the form of a corresponding amount of electrical power having a unipolarity voltage characteristic, said circuit comprising:

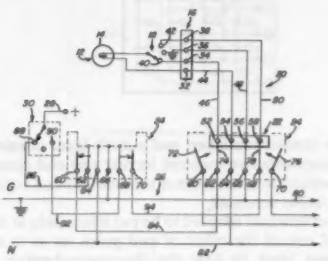
switching means having a first terminal means couplable to said waste energy source and a second terminal means connectable to the a.c. load and across the a.c. power mains for receiving a periodically varying voltage from the a.c. power mains, said switching means including controllable current conduction means interposed between the first and second terminal means for allowing the polarity of the unipolarity voltage to remain unchanged and for conducting current between said first terminal means and said second terminal means; and

control means coupled to said switching means for rendering said controllable current conduction means conductive for establishing a current flow at said second terminal means during periods when the voltage on said second terminal means causes said utilization circuit to comprise an electrical power source for the a.c. load for providing a net supply of power from the utilization circuit to the a.c. load.

4,059,773
SWITCH CONTROLLED POWER RECEPTACLE SYSTEM

Charles A. Nash, P.O. Box 1271, Chautauqua, N.Y. 14722

Filed July 15, 1976, Ser. No. 705,563
Int. Cl.[2] H01R *33/30*
U.S. Cl. 307—115 9 Claims



1. In combination with a source of electrical energy, a system of supplying said electrical energy to an electrically operated device, comprising a plurality of plug-in receptacles, a connector device having a plurality of prongs adapted to be inserted into any selected one of said receptacles, means electrically connecting said connector device to the electrically operated device for completing an operating circuit through the electrically operated device, each of said plug-in receptacles having normally closed contact means opened in response to insertion of the prongs into the receptacle, and electrical conduit means interconnecting the receptacles with said source for establishing said operating circuit only through the opened contact means of the selected one of the receptacles in series with the normally closed contact means of those receptacles located between the selected one of the receptacles and the source of electrical energy.

4,059,774
SWITCHING INVERTER WITH THERMOCONDUCTIVE MATERIALS

Olivier Cahen, Paris, France, assignor to Thomson-CSF, Paris, France

Filed May 11, 1976, Ser. No. 685,375
Claims priority, application France, May 13, 1975, 75.14878
Int. Cl.[2] H03K *3/26, 17/60, 19/08, 23/08*
U.S. Cl. 307—299 R 6 Claims

1. An inverter logic circuit comprising:

an input terminal;

an output terminal;

a first source terminal;

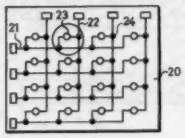
a second source terminal;

means for respectively connecting the first and second source terminals to a first and a second pole of a d.c. source;

a first switching element, consisting of a first substrate, and, successively deposited on said substrate, a first layer that is electrically resistant and insulated from said substrate, said layer having one end connected to said first source terminal and an other end connected to said input terminal; a second electrically insulating and thermally conductive layer; and a third layer consisting of a thermoconductive

material having one end connected to said first source terminal and another end connected to said output terminal;

a second switching element consisting of a second substrate, and, successively deposited on said substrate, a fourth layer that is electrically resistant and insulated from said substrate, said fourth layer having one end connected to said second source terminal, and another end connected to said input terminal; a fifth electrically insulating and thermally conductive layer; and a sixth layer consisting of a thermoconductive material having one end connected to said second source terminal and another end connected to said output terminal;



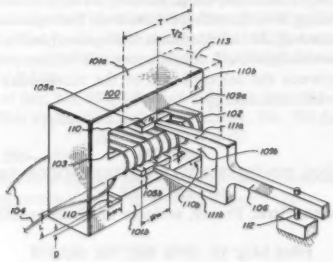
said input terminal adapted to be put alternately at the potential of one or the other of said poles, so as to cause the resistant layer to heat the thermoconductive layer, in order to have the potential of one or the other pole appear at said output terminal.

4,059,775

LINEAR MOTOR

Gary Paul Warmka, Bloomington, Minn., assignor to Control Data Corporation, Minneapolis, Minn.

Filed Nov. 22, 1976, Ser. No. 743,890
Int. Cl.[2] H02K *33/00*
U.S. Cl. 310—12 **4 Claims**



1. A linear motor comprising

a. an E-shaped field core of ferromagnetic material having a first leg and second and third legs on opposite sides of, substantially parallel to, and spaced apart from the first leg, at least one leg containing a notch adjacent the closed end of the space between adjacent legs;

b. a winding wound on the first leg and forming between itself and the second and third legs first and second slots respectively;

c. first and second substantially rectangular magnets having north and south pole faces opposite faced and spaced apart less than the width of each slot; and

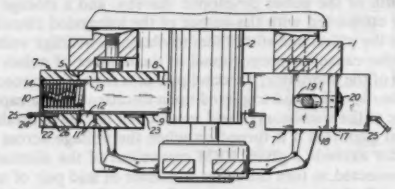
d. rotating arm means for supporting the first and second magnets in the first and second slots respectively, with similar pole faces adjacent the winding, for allowing translation of the magnets along the legs while maintaining the pole faces in substantially the same position during translation of the magnets.

4,059,776

ELECTRIC MOTOR BRUSH MOUNTING

Robert E. Schreiber, and Edward J. Zelt, both of St. Marys, Pa., assignors to Stackpole Carbon Company, St. Marys, Pa.

Filed Apr. 19, 1976, Ser. No. 678,023
Int. Cl.[2] H02K *13/00*
U.S. Cl. 310—242 **12 Claims**



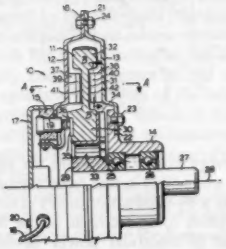
1. In an electric motor having a frame and a commutator rotatably mounted therein, the frame having a brush-receiving recess beside the commutator provided with top and bottom walls, a brush housing made of insulating material disposed in said recess, means holding said housing in fixed position in the recess, a brush disposed in the housing and slidable lengthwise thereof, a stationary metal strip inside the housing between the brush and one side of the housing, the strip extending substantially full length of the housing and having an outer end portion extending transversely of the brush and spaced therefrom, one side of the strip engaging the brush and the other side of the strip engaging the housing, a coil spring compressed between said end portion and the brush for holding the brush against the commutator, a flexible wire electrically connecting the brush with said end portion of the strip, and an electrical conductor engaging said strip.

4,059,777

COOLING OF DISCOIDAL DYNAMOELECTRIC MACHINES

Eric Whiteley, Peterborough, Canada, assignor to Canadian General Electric Company Limited, Toronto, Canada

Filed Sept. 15, 1975, Ser. No. 613,565
Claims priority, application Canada, Sept. 30, 1974, 210350
Int. Cl.[2] H02K *5/18*
U.S. Cl. 310—64 **22 Claims**



1. An axial gap, disc-type dynamoelectric machine comprising a housing having a pair of oppositely disposed side walls and other wall means defining an enclosure for a cooling fluid; a discoidal rotor located inside said housing spaced from said walls with the axis of the discoid transverse to and in the middle of said side walls; means for supporting said rotor for rotation on said axis; a first field pole structure located inside said housing between one wall thereof and said rotor and having a first plurality of axially oriented pole bodies equally

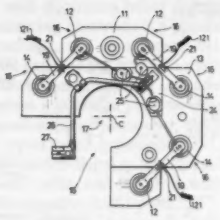
spaced from said axis and spaced apart so as to define radially directed interpolar spaces, said first pole bodies having planar pole faces located very near one planar surfaces of said rotor; a second field pole structure located inside said housing between the other wall thereof and said rotor and having a second plurality of pole bodies oriented axially with said first pole bodies and spaced apart so as to define other radially directed interpolar spaces, said second pole bodies having planar pole faces located very near the other planar surface of said rotor, and fluid directing means for inducing vortical flow of said cooling fluid in said interpolar spaces whereby the fluid transfers heat from the rotor to the housing.

4,059,778

RECTIFIER ASSEMBLY STRUCTURE, PARTICULARLY FOR AUTOMOTIVE-TYPE ALTERNATOR-RECTIFIER COMBINATION

Rüdiger Sohnle, Stuttgart, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Jan. 25, 1977, Ser. No. 762,772
Claims priority, application Germany, Jan. 31, 1976, 2603786
Int. Cl.[2] H02K *11/00*
U.S. Cl. 310—68 D **15 Claims**



1. Rectifier assembly to rectify the output of a three-phase alternator comprising

first and second heat sink cooling plates (**11, 13**);

a first group (**12**) of positive rectifying diode rectifiers secured in electrical and thermal contact to the first plate (**11**);

a second group (**14**) of negative rectifying diode rectifiers secured in electrical and thermal contact with the second plate (**13**);

and connecting leads (**19**) interconnecting the diode groups and the alternator phase windings (**121**),

wherein, in accordance with the invention,

the first and second heat sink plates (**11, 13**) are flat, elongated, essentially rectangular plates located radially symmetrically, and axially staggered with respect to the shaft (C) of the alternator and positioned in crossed relation with respect to each other.

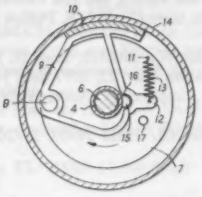
4,059,779

ELECTRIC MOTOR AND BRAKE ARRANGEMENT

Walter Wistinghausen, Bentweg 3, D-4930 Detmold 17, Germany

Filed May 4, 1976, Ser. No. 682,990
Claims priority, application Germany, May 7, 1975, 2520285
Int. Cl.[2] H02K *7/102*
U.S. Cl. 310—77 **9 Claims**

1. An electric motor and brake arrangement comprising an electric motor, a casing for said motor, a drive shaft for said motor, an output shaft for the arrangement, a support plate mounted on said output shaft for movement therewith and extending radially therefrom, a brake element mounted on said support plate, a brake drum associated with said casing, a brake shoe on said brake element for co-operating with said brake drum, spring means for urging said brake shoe into contact with said brake drum, torque transmitting means on said drive shaft for transmitting torque to said brake element in a direction to release said brake and stop means on said support plate



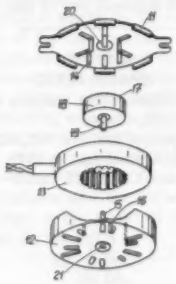
engageable with said brake element for transmitting torque from said brake element to said support plate.

4,059,780

SYNCHRONOUS MOTOR

Maurice Mazuir, Cluses, France, assignor to Carpano & Pons, France

Filed Dec. 22, 1975, Ser. No. 643,531
Claims priority, application France, Jan. 20, 1975, 75.01653
Int. Cl.[2] H02K *21/12*
U.S. Cl. 310—164 **2 Claims**



1. In a synchronous motor, a stator comprising a first plate having a plurality of axial poles spaced thereon from each other in a circular configuration and a second plate spaced from the first plate and in opposed relationship therewith, said second plate having a plurality of paired poles arranged in a circular configuration in pairs with the pairs spaced from each other, the individual pairs of poles disposed extending axially between next adjacent poles of the first plate, an induction coil circumferentially of all of said poles, a rotor disposed for rotation within the circular configuration of the poles of said first and second plates and coaxial therewith, the poles on each of said plates having ends spaced from the other opposed plate to define therebetween axial air gaps, the improvement wherein the air gaps defined by some poles of one of said plates have an axial length equal at most to one tenth the axial length of said some poles, and up to a maximum axial length of 1.2 mm.

4,059,781

SHADOW MASK EACH APERTURE OF WHICH IS DEFINED BY A QUADRUPOLAR LENS

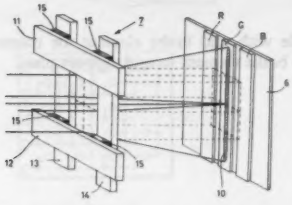
Willem Meijndert van Alphen, and Jan Verweel, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 590,315, June 25, 1975, abandoned. This application Mar. 22, 1977, Ser. No. 780,026

Claims priority, application Netherlands, July 17, 1974, 7409642

Int. Cl.² H01J *29/07, 31/20*

U.S. Cl. 313—403 **8 Claims**



1. A color television image producing tube comprising, an evacuated envelope, means to generate a plurality of electron beams, a display screen having a plurality of regions of elongate form luminescing in different colors, means for selectively impinging said beams each upon a respective luminescent color region, said means comprising an apertured electrode system interposed between said beam generating means and said display screen, said apertured electrode system comprising a plurality of quadrupolar lenses each defining an aperture for the passage of said beams to an associated color region of said screen, said quadrupolar lens comprising two pairs of electrode elements arranged in space quadrature, the electrode elements of each pair being arranged in spaced opposing relationship transverse to the path of said beams through the aperture oppositely confronting electrodes of said pairs operating at the same potential and adjacently positioned electrodes of said pairs operating at a potential difference whereby electrostatic fields having substantially hyperbolic configurations are formed between each adjacent pair of said electrodes.

4,059,782

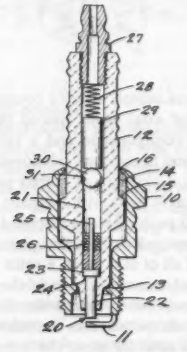
SPARK PLUG

Lawrence R. Lentz, Toledo, Ohio, assignor to Champion Spark Plug Company, Toledo, Ohio

Continuation-in-part of Ser. No. 701,582, July 1, 1976, abandoned. This application Apr. 4, 1977, Ser. No. 784,045

Int. Cl.² H01T *13/20*

U.S. Cl. 315—58 **2 Claims**



1. In a spark plug having a shell and an insulator seated in said shell and sealed therein against the passage of combustion gases, said insulator having a stepped central bore, an improved center electrode assembly mounted in said insulator bore comprising a lower center electrode element seated in said bore, said electrode element having first end means for defining one side of a main spark gap exterior to said bore and second end means defining one side of an auxiliary spark gap within said bore, an electrically conductive ball seated on a step in said bore, said ball being spaced from said second end means for defining a second side of such auxialy spark gap, an ignition noise suppressor positioned within said bore, a terminal, and springs means electrically connecting said ball, said suppressor and said terminal in series.

4,059,783

FIELD EMISSION APPARATUS

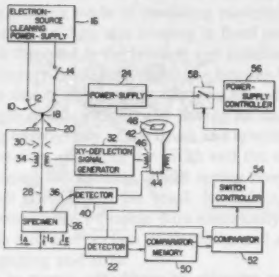
Yasushi Nakaizumi; Yukichi Ueno, both of Katsuta, and Masahide Okumura, Hachioji, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Jan. 12, 1977, Ser. No. 758,794

Claims priority, application Japan, Jan. 21, 1976, 51-5733

Int. Cl.² H05B *41/36*; H02H *7/20*

U.S. Cl. 315—107 **10 Claims**



1. An electron producing apparatus of the field emission type comprising:

a source for producing electrons;

an anode disposed opposite to said electron producing source;

first means for applying a voltage to said electron producing source so as to cause said electron producing source to emit a field emission electron current toward said anode;

second means for detecting the instantaneous value and the minimum value of the emitted electron current;

third means for comparing said instantaneous value with said minimum value and for delivering an output signal when said instantaneous value assumes a predetermined magnitude relative to said minimum value; and

fourth means for interrupting the field emission in response to said output signal of said third means.

4,059,784

ELECTRON-BEAM CONVERTER

Vladimir Innokentievich Perevodchikov, ulitsa Krzhizhanovskogo, 4, korpus 2, kv. 32; Valentina Nikolaevna Shapenko, ulitsa Verkhne-Pervomaiskaya, 63, korpus 2, kv. 60; Zarem Sergeevich Chernov, prospekt Garibaldi, 19, kor. 2, kv. 66, and Nina Sergeevna Bunina, ulitsa Polyarnaya, 13, kor. 1, kv. 87, all of, Moscow, U.S.S.R.

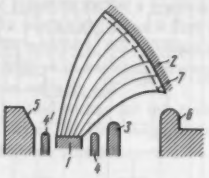
Filed June 14, 1976, Ser. No. 695,980

Int. Cl.² H01J *21/14, 21/26*

U.S. Cl. 315—349 **9 Claims**

1. An electron-beam converter comprising: a cathode; an anode; an accelerating electrode; control electrodes; all of said electrodes being made elongate; said control electrodes being arranged near said cathode on either side of an electron flow; a cathode-adjacent focusing electrode disposed on the cathode

side opposite to said accelerating electrode, behind one of said control electrodes; an anode-adjacent focusing electrode inserted between said anode and said accelerating electrode; said anode having a surface orthogonal with respect to a divergent electron flow and being so arranged relative to said cathode that the angle between normals to the surfaces of said electrodes. is greater than zero but less than 180°; said accelerating electrode being disposed in the opening of said angle; the distance between said accelerating electrode and said anode being substantially greater than that between said cathode and said accelerating electrode; all of said electrodes making up an electron-optical system shaping said electron flow into a curvi-



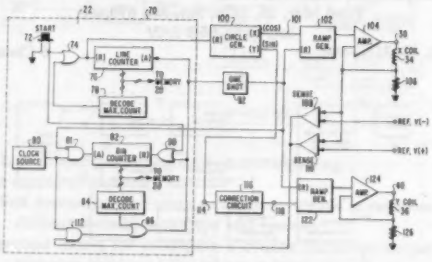
linear beam broadening towards said anode so as to prevent electrons from impinging upon said accelerating electrode; the potentials across said electrodes being distributed so that applied to said accelerating electrode is a potential positive with respect to said cathode, the anode potential is also positive with respect to said cathode but is substantially lower than the accelerating electrode potential, said cathode-adjacent focusing electrode receives a potential close or equal to the cathode potential said anode-adjacent focusing electrode receives a potential close or equal to the anode potential, and said control electrodes have potentials equal to the cathode potential during the positive half-cycle, and negative with respect to said cathode during the negative half cycle.

4,059,785

CRT DISPLAY WITH TRUNCATED RHO-THETA PRESENTATION

Charles Albert Clark, Jr., Chatsworth, Calif., assignor to RCA Corporation, New York, N.Y.

Filed May 19, 1976, Ser. No. 687,747
Int. Cl.² H01J *29/78*
U.S. Cl. 315—378 **9 Claims**



1. In a cathode ray tube display device which has a viewing screen and which includes a deflectable electron beam and which includes a deflection means for causing said beam to scan from a common origin on said screen across said viewing screen to and beyond the edge of said viewing screen in a succession of scan lines, the improvement comprising:

first means responsive to an indication that said electron beam has been scanned to said edge of said viewing screen for producing a signal; and

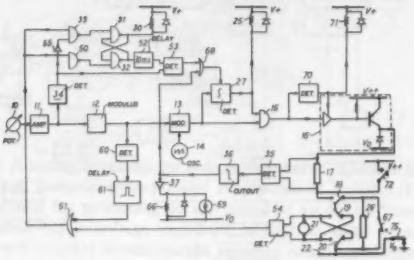
second means responsive to said signal for initiating retrace of said electron beam to said common origin, and a fixed time after initiating said retrace for initiating the deflection by said deflection means of the next scan line of said succession thereof.

4,059,786

WHEELCHAIR CONTROL CIRCUIT

Michael Lloyd Jones, Tring, and Peter Meredith Jobson, Aylesbury, both of England, assignors to Possum Controls Limited, Aylesbury, England

Filed May 16, 1975, Ser. No. 578,023
Claims priority, application United Kingdom, May 23, 1974, 23004/74
Int. Cl.² B62D *11/04*; H02P *7/00*
U.S. Cl. 318—17 **13 Claims**



1. A control circuit suitable for use in controlling the two electric motors of a wheelchair of the type specified, comprises two control potentiometers with respective wipers which are connected to a common control lever, said control lever having a datum position and being operable from the datum position to manipulate the positions of the wipers of the potentiometers both independently and simultaneously from their corresponding datum positions, terminals through which voltages can be applied across the resistance-elements of the potentiometers whereby the output voltages at the wipers have magnitudes dependent upon the positioning of the control lever, a predetermined magnitude corresponding to the datum position and deviations on opposite sides of the predetermined magnitude constituting control signals for forward and reverse operation respectively of the two motors, each motor having a reversing relay connected thereto and the energising circuit of each reversing relay including a detector circuit individual to the relay and the corresponding control potentiometer, the detector circuit including means for detecting output voltage from its associated control potentiometer representative of a control signal for reverse operation of the motor to energise the associated reversing relay, and further means for driving each motor in dependence upon the deviation in the magnitude of the output voltage at the wiper of its associated control potentiometer from the datum.

4,059,787

METHOD FOR THE AUTOMATIC LOCATION OF PARTICULAR ZONES OF A SURFACE AND AN INSTALLATION FOR THE APPLICATION OF SAID METHOD

Jean Louis Aimar, Meunecy, and Gerard Olin, Le-Plessis-Robinson, both of France, assignors to SEVE, Chatillon-sous-Bagneux, France

Filed Mar. 25, 1976, Ser. No. 670,271
Claims priority, application France, Mar. 28, 1975, 75.09846
Int. Cl.² G05B *19/42*
U.S. Cl. 318—568 **19 Claims**

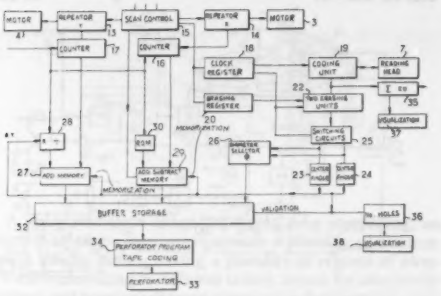
1. A method for the automatic location of particular zones on a surface, especially of points to be machined on the surface of a workpiece by an automatic machine which operates point by point, wherein said method consists:

in giving said particular zones a distinctive appearance with respect to the region surrounding said zones on said sur-

face, especially an appearance which is transparent at the center of an opaque pastille,

in automatically scanning the surface in a system of two coordinates, especially perpendicular rectilinear coordinates, by means of a reader comprising at least one detecting element which is responsive to said distinctive appearance,

in establishing by means of electrical signals delivered by the reader a primary image coded in binary notation in which two different states represent respectively the presence and absence of said distinctive appearance at each point of the surface which is scanned by the detector,



in processing said primary image in coded form in order to erase in successive points from the edges thereof in accordance with said system of coordinates all the states which are representative of the presence of the distinctive appearance encountered before a zone of absence of said distinctive appearance in order to obtain a clear image in coded form only of those points which have said distinctive appearance and are separated from the edges of the image by one point or a plurality of successive points which do not have said distinctive appearance,

in determining the coordinates of at least a certain number of the points having a distinctive appearance which remain on said clear image.

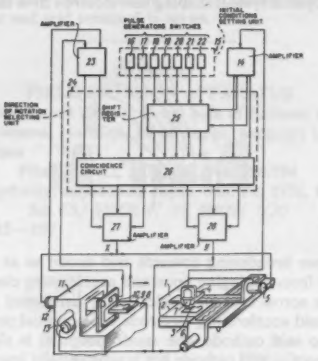
4,059,788

DEVICE FOR AUTOMATICALLY CONTROLLING AN ELECTROEROSION CUTTING MACHINE

Vladimir Sergeevich Vasiliev, Novye Cheremushki, kvartal 26/6, korpus 28, kv. 67; Abram Lazarevich Livshits, Profsojuznaya ulitsa, 62, korpus 2, kv. 69; Vadim Evgenievich Polotsky, Leninsky prospekt, 70/11, kv. 238, and Yakov Iosifovich Zlatkin, Shosseinaya ulitsa, 42, kv. 311, all of Moscow, U.S.S.R.

Filed Feb. 2, 1976, Ser. No. 654,284
Int. Cl.[2] G05B *19/36*
U.S. Cl. 318—577 **2 Claims**

1. A device for automatically controlling an electroerosion cutting machine, comprising: a coordinate follow table with a drawing placed thereon; an optical reading head; coordinate drive motors which move coordinate-wise said optical reading head relative to said drawing and an electroerosion tool relative to a workpiece; a first amplifier having an input connected to the output of said optical reading head, and four outputs; a second amplifier having an input connected to the erosion gap, and two outputs; a unit for setting initial conditions of electroerosion working having outputs; a unit for selecting directions of rotation of said drive motors in the course of said electroerosion working and having inputs and outputs; a reversible ring shift register of said unit for selecting directions of rotation of said drive motors and having inputs and outputs, inputs of said reversible ring shift register being connected to outputs of said unit for setting initial conditions of electroerosion working intended for a signal of initial rotation directions, said outputs of the unit for setting initial conditions of electroerosion working being intended for a signal of shift speed of said reversible ring shift register, and said first and second outputs of said first amplifier being intended for signals for reversing the shift direction of said register; a coincidence circuit in said unit for selecting directions of rotation of said drive motors and having inputs and outputs, inputs of said coincidence circuit being connected to said third and fourth outputs of said first amplifier, said outputs of said reversible ring shift register, said outputs of said second amplifier, and outputs of the unit for setting initial conditions of electroerosion working being intended for a signal of preset rotation speeds of said drive motors; a third amplifier having three inputs connected to the said three first outputs of said coincidence circuit, and two outputs connected to said drive motors for moving said optical head relative to said coordinate table and said electroerosion tool relative to said workpiece along the first coordinate; a fourth amplifier having three inputs connected to said three other outputs of said coincidence circuit, and two outputs connected to said drive motors for moving said optical head relative to said coordinate table and said electroerosion tool relative to said workpiece along the second coordinate.

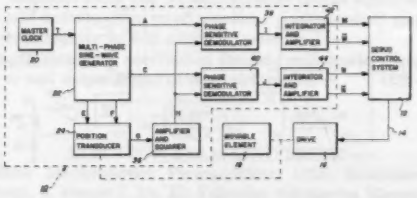


4,059,789

PHASE-SENSITIVE TRANSDUCER APPARATUS WITH SIGNAL OFFSET MEANS

Kenneth W. Cocksedge, Pleasanton, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Mar. 25, 1976, Ser. No. 670,463
Int. Cl.[2] G05B *1/01*
U.S. Cl. 318—608 **6 Claims**



1. A phase-sensitive transducer apparatus comprising:

first and second relatively movable members, said first relatively movable member having a plurality of windings and said second relatively movable member having a winding;

means for applying a first input signal to one of the windings of said first relatively movable member and a second input signal to another of the windings of said first relatively movable member, an output signal being developed on the winding of said second relatively movable member, said first and second input signals being sinusoidal in nature of substantially identical frequency and peak amplitude and

being phase-displaced by a predetermined amount, and said output signal being substantially constant in peak amplitude and variable in phase during relative movement of said first and second relatively movable members;

means coupled to the winding of said second relatively movable member for squaring said output signal;

means coupled to said means for squaring for demodulating said squared output signal to derive a pulse signal of constant peak amplitude and variable pulse width as said first and second relatively movable members are moved relative to one another;

means coupled to said means for demodulating for integrating said pulse signal to derive a position signal indicative of the relative movement of said first and second relatively rotatable members, said position signal alternating during such relative movement between a peak voltage and a reference voltage; and

means coupled to said means for integrating for offsetting said position signal so that it is substantially balanced about said reference voltage.

4,059,790

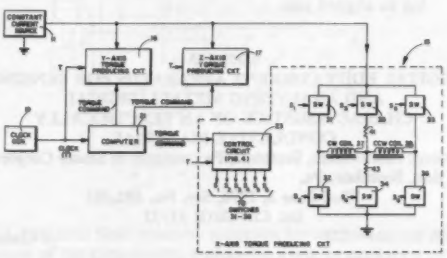
NON-OSCILLATING TORQUE CONTROL APPARATUS

John M. Kennel, Santa Ana, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Oct. 18, 1976, Ser. No. 733,839

Int. Cl.[2] G05B *17/00*; H02P *7/00*

U.S. Cl. 318—689 **15 Claims**



1. A torque producing apparatus comprising:

a source of current;

first means for producing a clockwise torque in response to current therethrough from said source;

second means for producing a counterclockwise torque in response to current therethrough from said source,

switching means responsive to a plurality of control signals for selectively coupling said first and second means to said source; and

control means responsive to a torque command signal for selectively generating the plurality of control signals as a function of the torque command signal, said plurality of control signals enabling said switching means to selectively control the flow of current through said first and second means such that the clockwise and counter-clockwise torques combine into a resultant non-oscillating torque corresponding to the torque commanded by the torque command signal.

4,059,791

VOLTAGE SUPPLY CIRCUIT FOR VOLTAGE-DEPENDENT CAPACITOR DIODE TUNING

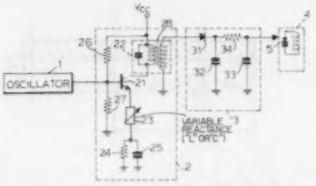
Masabumi Serizawa, Ikoma, and Tsuneo Takezaki, Noyagawa, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Apr. 30, 1976, Ser. No. 682,176

Claims priority, application Japan, May 6, 1975, 50-54847

Int. Cl.[2] H02M *3/335*

U.S. Cl. 363—37 **10 Claims**



6. A tuning apparatus for voltage-dependent capacitor diode tuning, comprising: a voltage supply circuit having: (1) an oscillator for producing an a.c. signal at an output terminal thereof; (2) a voltage regulator having an input terminal thereof coupled to said output terminal of said oscillator for producing an a.c. voltage at an output terminal thereof, said voltage regulator having a transistor amplifier of the series-feedback type having an amplifying transistor the base of which is coupled to said oscillator and a variable reactance element coupled to the emitter of said transistor for controlling the amount of negative feedback and controlling the degree of amplification of said transistor amplifier, and a tank circuit having a resonant frequency the same as the frequency of said a.c. signal from said oscillator, said tank circuit being coupled to the collector of said amplifying transistor and also coupled to said output terminal of said voltage regulator; and 3) a voltage converter having the input terminal thereof coupled to said output terminal of said voltage regulator for converting said a.c. voltage from said voltage regulator to a d.c. voltage; and a tuning circuit including a voltage-dependent capacitor diode to which said d.c. voltage from said voltage converter is applied for tuning.

4,059,792

METHOD FOR PRODUCING RECTIFIER WITH SWITCHES OF ASYMMETRIC VOLTAGE BREAKDOWN STRENGTHS

Peter Etter, Oberehrendingen, and Werner Faust, Wettingen, both of Switzerland, assignors to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed Sept. 30, 1975, Ser. No. 619,941

Claims priority, application Switzerland, Oct. 29, 1974, 14457/74

Int. Cl.[2] H02M 7/757; H03K 3/35

U.S. Cl. 363—135 **7 Claims**

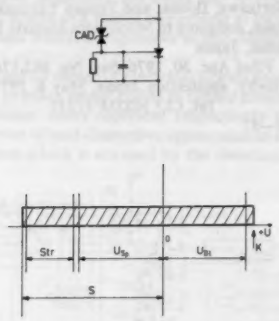
1. A method for producing rectifiers for medium and high voltage systems at reduced cost comprising the steps of:

providing a rectifier element including a plurality of series connected thyristor switches,

constructing said rectifier element so as to have an asymmetric breakdown voltage characteristic in which the breakdown strength is at least 10% greater in the reverse direction than in the forward direction; and,

dimensioning said rectifier element voltagewise to safely block even long lasting overvoltages in both the forward

and reverse blocking directions occurring during operation and to withstand momentary surge and switching



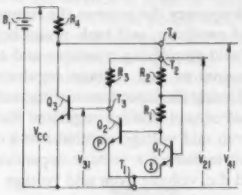
voltages limited by an overvoltage suppressor in the reverse blocking direction.

4,059,793

SEMICONDUCTOR CIRCUITS FOR GENERATING REFERENCE POTENTIALS WITH PREDICTABLE TEMPERATURE COEFFICIENTS

Adel Abdel Aziz Ahmed, Annandale, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Aug. 16, 1976, Ser. No. 714,361
Int. Cl.² G05F 1/58
U.S. Cl. 323—19 **7 Claims**



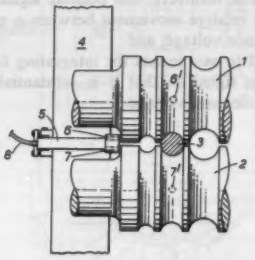
1. A reference potential generator comprising:
first and second and third terminals;
bias means for tending to increase the potential between said first and said second terminals;
first and second transistors of the same conductivity type, each having base and emitter electrodes with a base-emitter junction therebetween and having a collector electrode, each of their emitter electrodes being directly connected without substantial intervening impedance to said first terminal;
a first resistive element having a first end which connects to the base electrode of said first transistor and having a second end which connects to the base electrode of said second transistor and has the collector electrode of said first transistor connected thereto;
a second resistive element having a first end connected to said second terminal and having a second end connected to the first end of said first resistive element;
a third resistive element having a first end connected to said second terminal and having a second end connected to a third terminal and to the collector electrode of said second transistor;
means for sensing when the potential between said first and third terminals exceeds a predetermined threshold value to decrease the potential between said first and said second terminals, thereby to generate a reference potential; and
means applying between said first and said second terminals a fixed portion of said reference potential, thereby completing a feedback loop for regulating said reference potential to prescribed value.

4,059,794

METHOD AND APPARATUS FOR MONITORING PASS ALIGNMENT IN ROLLING MILLS

Bernard J. Furness; John R. Cousins, and Dennis Tuft, all of Rotherham, England, assignors to British Steel Corporation, London, England

Filed July 7, 1975, Ser. No. 593,389
Claims priority, application United Kingdom, July 15, 1974, 31276/74
Int. Cl.² G01R 33/12
U.S. Cl. 324—208 **11 Claims**



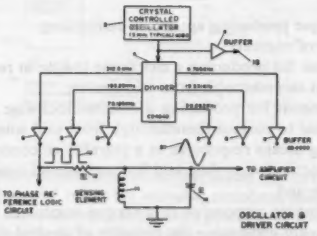
1. A method of monitoring the alignment of a rolling pass defined between cooperating rolls in a mill stand during rolling of a bar, rod or section stock, comprising the steps of:
fixedly positioning an eddy current sensor in close proximity to an end surface of each of said cooperating rolls,
energizing said sensors to provide outputs representative of the amount by which said sensors are spaced from the said end surfaces, and
processing said outputs to indicate changes in the spacing of said rolls along their axes from a reference position defining an aligned pass.

4,059,795

DIGITAL EDDY CURRENT APPARATUS FOR SENSING AND ANALYZING METALLURGICAL CHARACTERISTICS OF AN ELECTRICALLY CONDUCTIVE MATERIAL

George Mordwinkin, Scottdale, Pa., assignor to Sensor Corporation, Scottdale, Pa.

Filed June 3, 1976, Ser. No. 692,481
Int. Cl.² G01R 33/12
U.S. Cl. 324—233 **8 Claims**



1. A digital eddy current apparatus for sensing and analzying metallurgical characteristics of an electrically conductive material comprising:
a. driving means supplying a square wave which is used as a reference;
b. a resonating means coupled to the driving means, the

resonating means having a sensing element with an impedance which varies depending upon an eddy current characteristic of the electricity conductive material, the resonating means changes the square wave to a sinusoidal waveform which is a function of the impedance of the sensing element;

c. converting means coupled to the resonating means and converting the sinusoidal waveform produced by the resonating means into a rectangular pulse output, which pulse, when the resonating means is at a resonance condition, when referenced to the square wave pulse would be positioned in the center of one-half of the square wave, when the resonating means is magnetically coupled to the conductive material, the amplitude and phase of the sinusoidal waveform will be affected by the material characteristics, and the width and phase of the rectangular pulse will also be affected, the width of the rectangular pulse is a direct function of the amplitude of the sinusoidal waveform, movement of the rectangular pulse from its referenced position in the center of one-half of the square wave is a function of phase shift of the sinusoidal waveform; and

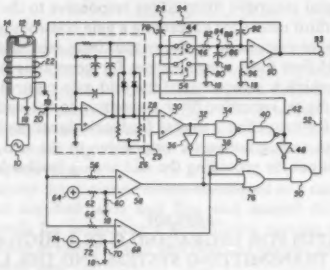
d. means for monitoring the width and position of the rectangular pulse with respect to the reference square wave as a direct function of the electrically conductive material's metallurgical characteristics.

4,059,796

SECOND HARMONIC MAGNETIC FIELD DETECTION CIRCUIT WITH MEANS TO RECTIFY THE SENSED SIGNAL

Melvin H. Rhodes, Cedar Rapids, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Nov. 11, 1976, Ser. No. 740,911
Int. Cl.² G01R *33/04*
U.S. Cl. 324—253 **7 Claims**



1. Magnetic field detection apparatus for use with a magnetic sensor of the type having a magnetic core, an excitation producing winding, an excitation detecting winding, and a magnetic field sensing winding operatively associated with said core, comprising:

means for supplying a periodic excitation signal to said excitation producing winding to induce a flux in said magnetic core to drive said magnetic core periodically into saturation, to induce a voltage in the excitation detection winding and to enable the magnetic field to be detected to induce a signal onto said sensing winding;

first means connected to said excitation detecting winding for detecting the direction of the flux produced in said magnetic core by the excitation signal and generating signals indicative thereof;

second means connected to said excitation detecting winding for detecting the polarity of the induced voltage and when the induced voltage exceeds a predetermined level and generating signals indicative thereof;

integrating means having an input and an output;

means connected to the sensing winding and to the signals from said first and second means to rectify the signals induced onto said sensing winding in timed relation with changes in the polarity of the induced excitation voltage and the direction of the excitation signal induced flux, and supplying the rectified signals to the input of said integrating means;

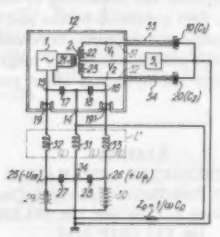
and feedback means connected between the output of said integrating means and said sensing winding for supplying feedback signals to said sensing winding to substantially cancel the effect of flux generated in said magnetic core by the magnetic field to be detected.

4,059,797

A.C. CAPACITANCE MEASURING BRIDGE

Michel J. L. Gay, Fresnes, France, assignor to Office National d'Etudes et de Recherches Aerospatiales, Chatillon-sous-Bagneux, France

Filed Dec. 27, 1976, Ser. No. 754,578
Claims priority, application France, Dec. 30, 1975, 75.40114
Int. Cl.² G01R *27/26*
U.S. Cl. 324—60 C **7 Claims**

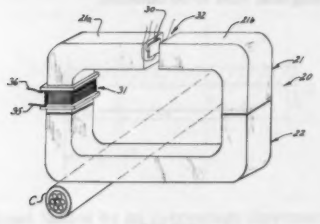


1. An alternating current capacitance measuring bridge for measuring the capacitance of capacitors having one terminal connected to an ground comprising an alternating voltage source, a differential transformer having a primary winding connected to said alternating voltage source and two secondary windings having a common terminal, screened coaxial connections for connecting said capacitors to said secondary windings, a detector inserted in said common terminal of said secondary windings via an amplification stage, a first metal screen box connected to said common terminal of said secondary windings inside of which said alternating voltage source and said primary and secondary windings are placed, whose interior is connected directly to first conductors of the screens of said screened coaxial connections, which surround coaxially the internal conductors of said screened coaxial connections, means for direct current supplying said alternating voltage source via internal direct current supply terminals comprising a first winding connecting to said common terminal of said secondary windings and said external earth, a second and a third windings connecting to said internal direct current supply terminals and external direct current supply terminals, said first, second and third windings having a high impedance at the operational frequency of said alternating voltage source, two first capacitors of high impedance inserted between said internal direct current supply terminals and said first metal screen box, and two second capacitors of high impedance inserted between said external direct current terminals and said external earth.

4,059,798
METHOD AND APPARATUS FOR MEASURING THE CURRENT FLOWING IN A WORKPIECE

Jeffrey A. Dierker, Westerville, and Prentice G. Moore, Columbus, both of Ohio, assignors to F. W. Bell, Inc., Columbus, Ohio

Filed Mar. 8, 1976, Ser. No. 664,716
Int. Cl.[2] G01R 33/00
U.S. Cl. 324—127 5 Claims

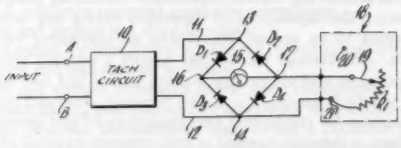


1. The method of measuring the current flowing in a workpiece which comprises placing the workpiece inside a magnetic core, continuously inducing a plurality of damped, oscillatory-waveform magnetic fields in said magnetic core at closely spaced intervals so as to maintain the core at all times on an idealized magnetization curve essentially without hysteresis while said workpiece is present therein and current is flowing in the workpiece, and measuring by means of a flux sensor the magnetic field generated by the said current while said workpiece is inside said magnetic core and immediately after at least one of said induced oscillatory magnetic fields has been applied whereby the hysteresis effect present is minimized.

4,059,799
TACHOMETER APPARATUS

Thomas G. Faria, 17 Park Drive, Waterford, Conn. 06385

Filed June 7, 1976, Ser. No. 693,535
Int. Cl.[2] G01P 3/48
U.S. Cl. 324—169 18 Claims

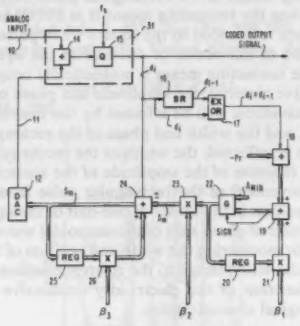


1. Electric tachometer instrumentation having selective adaptability to each of a plurality of engine configurations having different numbers of cylinders and adapted to function in response to a pulsating input signal characterized by pulses of alternating polarity and for which the pulsating frequency bears a direct relation to a speed to be measured, said instrumentation comprising a full-wave rectifier bridge having four arms serially connected at four corner terminals, a first pair of opposed terminals being adapted to receive said input signal, current-measuring means connected across the other pair of opposed terminals, and selectively operable means including on-off switch means connected in shunt across one of said arms; whereby in the OFF-selected position of said switch means, said measuring means will correctly produce an engine-speed measuring response for an engine of a first number of cylinders; and whereby in the ON-selected position of said switch means, said measuring means will again correctly produce an engine-speed measuring response for a similar engine having a greater number of cylinders.

4,059,800
DIGITAL MULTI-LINE COMPANDED DELTA MODULATOR

Gardner Dulany Jones, Jr., Raleigh, N.C., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed June 30, 1976, Ser. No. 701,265
Int. Cl.[2] H04B 1/00
U.S. Cl. 325—38 B 10 Claims

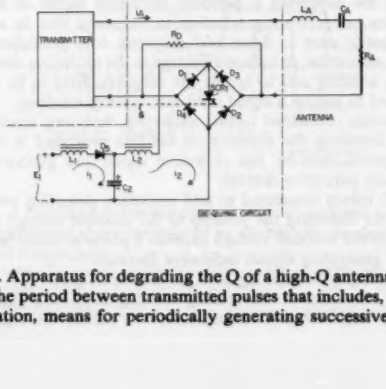


1. A delta modulator comprising:
a first means for comparing the amplitudes of an analog input signal and an analog feedback signal and periodically providing a first or a second output signal voltage d_i as a function of said comparison;
second means for forming the product of the output signal d_i of the current period and the output signal of the next prior period d_{i-1};
third means for summing the said product during each period with a digital reference signal;
a first digital recursive filter means responsive to the output of said third means for generating a gain control signal Δ_m;
fourth means responsive to the output from said first means and said first filter means output for generating a digital signal which is a function of the said gain control signal;
a second digital recursive filter responsive to the said fourth means for providing a digital feedback signal; and
a digital to analog converter responsive to the said second filter output for providing the said analog feedback signal.

4,059,801
APPARATUS FOR DEGRADING Q IN A HIGH-Q RF PULSE TRANSMITTING SYSTEM AND THE LIKE

Paul R. Johannessen, 40 Tyler Road, Lexington, Mass. 02173, and Peter Ver Planck, 103 Puritan Lane, Sudbury, Mass. 01776

Filed Dec. 11, 1975, Ser. No. 639,908
Int. Cl.[2] H04B 1/04; G01S 1/24
U.S. Cl. 325—167 11 Claims



6. Apparatus for degrading the Q of a high-Q antenna circuit in the period between transmitted pulses that includes, in combination, means for periodically generating successive pulses,

high-Q antenna circuit means connected to receive said pulses and to resonate in response thereto to produce corresponding periodic RF pulse transmissions, resistive loss-producing means, means for introducing said resistive loss-producing means into the antenna circuit only for the length of the time interval between said successive pulses and removing the same during said pulse transmissions, said introducing means comprising electronic switching means controlled by time-constant charging and discharging circuit means.

4,059,802

INPUT LEVEL DISPLAY CIRCUIT FOR RECEIVERS

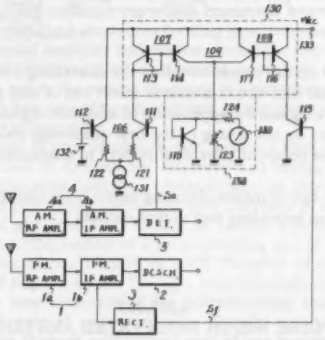
Mitsuo Ohsawa, Fujisawa; Wataru Yamatani, Hatogaya, and Yukio Onoe, Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Mar. 30, 1976, Ser. No. 671,968

Claims priority, application Japan, Apr. 2, 1975, 50-40702; Apr. 2, 1975, 50-40703

Int. Cl.² H04B *1/16*

U.S. Cl. 325—398 **12 Claims**



1. An input level display circuit for receivers, comprising:

a. first and second input circuits for receiving and amplifying first and second broadcasting signals, respectively,

b. first and second carrier amplitude detector circuits connected to said first and second input circuits, respectively, for producing first and second direct current signals, respectively;

c. a meter drive circuit means connected to a current supply and supplied with said first and second direct current signals for producing a third direct current signal in response to either one of said first and second direct current signal; and

d. an indicating means connected to a reference potential supplied with said third direct current signal for indicating the input level of either the first input circuit or the second input circuit, said indicating means being separated from said current supply by said meter drive circuit means.

4,059,803

METHOD OF CONVERTING THE ELECTROMAGNETIC SPECTRUM CARRIER FREQUENCY AND AN ELECTROMAGNETIC ENERGY RECEIVER FOR SAME

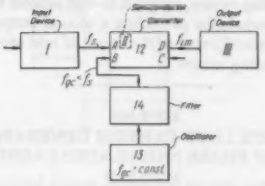
Leonard Konstantinovich Mikhallovsky, Fakultetsky pereulok 6, kv. 25, Moscow, U.S.S.R.

Continuation of Ser. No. 424,611, Dec. 13, 1973, abandoned. This application Apr. 20, 1976, Ser. No. 678,723

Int. Cl.² H03D *7/00*

U.S. Cl. 325—445 **25 Claims**

1. In a method of converting the carrier frequency of the electromagnetic frequency spectrum in an electromagnetic energy receiver including a converter, the steps of: transmitting to the input of said converter incoming electromagnetic waves and conveying from the output thereof converted electromagnetic waves, having the incoming electromagnetic waves act on at least one semiconductor element in said converter with the electromagnetic characteristics thereof depending on the intensity, polarization and frequency of the field associated with said incoming electromagnetic waves, effecting auxiliary power modulation of said incoming electromagnetic waves, and subjecting the frequency spectrum, polarization and intensity of the field set up by said incoming elec-



tromagnetic waves to said auxiliary power modulation, to establish the magnitudes and directions of the magnetic or electric moments, and the conductance and impedance of said semiconductor element such that said carrier frequency of each region in the spectrum of the converted electromagnetic waves becomes a multiple of the frequency of said auxiliary power modulation of said electromagnetic waves being converted.

4,059,804

FREQUENCY COMPARISON CIRCUIT

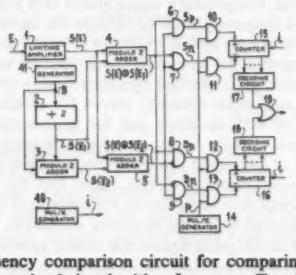
Pierre Agnus, and Henri Butin, both of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Nov. 19, 1976, Ser. No. 743,333

Claims priority, application France, Nov. 25, 1975, 75.36003

Int. Cl.² H03D *13/00*

U.S. Cl. 328—134 **5 Claims**



1. A frequency comparison circuit for comparing the frequency of a received signal with a frequency F and comprising:

first means for producing, independently of the received signal, a reference signal having the frequency F,

second means for generating sampling pulses,

third means for determining as a function of time t the relation between the sign "m" of the received signal at time t, the sign "p" of said reference signal at time t and the sign "q" of said reference signal at time $t-T$, T being a predetermined time interval such that $2\pi FT$ is not a multiple of π, and for generating a first relation signal if "m" is different from "p" and "q", a second relation signal if "m", "p" and "q" are alike, a third relation signal if "m" is identical with "p" and different from "q" and a fourth relation signal if "m" is different from "p" and identical with "q"

first and second bidirectional counting means,

means controlled by said third means for, for each sampling pulse, causing said first bidirectional counting means to change its count if one of said first or second relation signal is present, the change being in one direction or the other according to whether said first or said second relation signal is present, and causing said second bidirectional

counting means to change its counts if one of said third or fourth relation signal is present, the change being in one direction or the other according to whether said third or fourth relation signal is present,

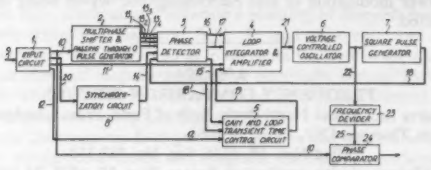
and an output circuit comprising first detecting means, coupled to said first bidirectional counting means, for providing a first output signal for a predetermined value of the count of said first bidirectional counting means and second detecting means, coupled to said second bidirectional counting means, for providing a second output signal for a predetermined value of the count of said second bidirectional counting means.

4,059,805

PHASE LOCK LOOP CARRIER GENERATOR FOR RECEIVER OF PHASE MODULATED CARRIER PULSE SIGNALS

Patrick M. de Laage de Meux, St. Germain-en-Laye, and Michel J. Maitre, Conflans-Sainte-Honorine, both of France, assignors to Lignes Telegraphiques et Telephoniques, Paris, France

Filed Feb. 1, 1977, Ser. No. 764,543
Claims priority, application France, Feb. 3, 1976, 76.02867
Int. Cl.[2] H03D 3/02; H03K 9/04
U.S. Cl. 329—50 **5 Claims**



1. A demodulator of phase modulated carrier pulse signals in which the pulses are coded according to a plurality of N phases of the carrier, comprising a digital phase lock loop system for locking to a frequency equal to N times the carrier frequency, said phase lock loop system including at least a phase detector, a loop integrator fed from said phase detector and itself controlling a voltage controlled oscillator having an output connected to said phase detector, means for dividing by N the frequency of said oscillator and for generating a reference carrier signal, a phase comparator for comparing the phase of the carrier of said phase modulated carrier pulse signals to the phase of said reference carrier signal and for delivering a decoded signal depending on the comparison of the two latter phases, a multiphase shifter receiving the carrier of said phase modulated carrier pulse signals and locally generating a plurality of carriers having phase shifts equal to 0, $2\pi/N$, $2\times 2\pi/N$, . . . $([N/2]-1)\times 2\pi/N$ with respect to said received carrier, means for generating passing through zero pulses coinciding with the passage through zero of said received and locally generated carriers, means for gating those of said passing through zero pulses which occur during the central part of each phase modulated carrier pulse and means for applying to said phase detector said gated passing through zero pulses.

4,059,806

PULSE POSITION DEMODULATOR CIRCUIT

Henry Tyrrell Vagt, Jr., Scarsdale, N.Y., assignor to The Singer Company, Little Falls, N.J.

Filed Nov. 15, 1976, Ser. No. 741,759
Int. Cl.[2] H03K 9/04
U.S. Cl. 329—107 **8 Claims**

1. A pulse position demodulator circuit for providing digital outputs representative of the time spacing between received incrementally modulated pulse pairs, said circuit comprising:

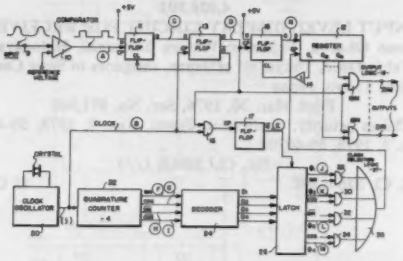
a clock oscillator for generating a clock signal of relatively high frequency;

quantizing circuit means coupled to the clock oscillator for producing quantized pulses synchronized with said clock signal in response to the received modulated pulse pairs;

shift register means;

means coupling said quantizing circuit means to said shift register means for propagating the quantized pulses down the shift register means;

first circuit means coupled to the clock oscillator for producing a plurality of clock signals and having predetermined mutual phase relationships with one another;



further circuit means coupling the quantizing circuit means to said first circuit means to select one of said plurality of clock signals for application to said shift register as determined by the timing of the first quantizing pulses of each of the received pairs with respect to a selected reference; and

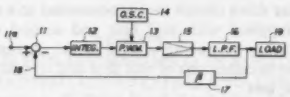
output circuit means obtaining inputs from said shift register means providing said digital outputs.

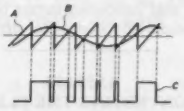
4,059,807

PULSE WIDTH MODULATED AMPLIFIER

Osamu Hamada, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Oct. 29, 1975, Ser. No. 626,823
Claims priority, application Japan, Nov. 2, 1974, 49-126802
Int. Cl.[2] H03F 3/38
U.S. Cl. 330—10 **5 Claims**





1. A pulse width modulated amplifier circuit comprising:

a mixer having audio and feedback inputs and an output,

means for integrating a signal derived from said output,

means for pulse width modulating a signal derived from an output of said integrating means,

means for filtering said pulse width modulated signal and for applying said filtered signal to a load, and

means for feeding back a portion of said filtered signal to said mixer,

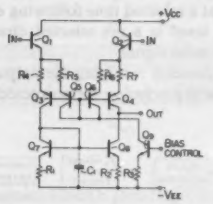
said integrating means eliminating any modulating signal from the feedback from passing to said pulse width modulating means.

4,059,808

DIFFERENTIAL AMPLIFIER

Yoshio Sakamoto, Kokubunji, and Masahiro Yamamura, Fuchu, both of Japan, assignors to Hitachi, Ltd., Japan

Filed July 23, 1976, Ser. No. 708,046
Claims priority, application Japan, July 30, 1975, 50-91922
Int. Cl.[2] H03F 3/45
U.S. Cl. 330—257 6 Claims



1. A differential amplifier comprising:

an input amplifier stage comprising a first pair of npn transistors having collector electrodes connected to a first voltage supply, base electrodes forming input terminals of said differential amplifier and emitter electrodes, and a second pair of pnp transistors each having an emitter electrode connected to the emitter electrode of a corresponding one of said first pair of npn transistors, a base electrode and a collector electrode;

a third pair of pnp transistors each having a base electrode connected to its collector electrode and having substantially the same operating characteristics as those of said second pair of pnp transistors, each transistor of said third pair of pnp transistors having an emitter electrode connected to the emitter of a corresponding one of said second pair of pnp transistors, each transistor of said third pair of pnp transistors having a base electrode connected to the base electrode of the corresponding one of said second pair of pnp transistors, thereby providing bias currents through said second pair of pnp transistors and compensating for changes in operating characteristics of said second pair of pnp transistors due to temperature fluctuations;

bias circuit means connected to the base electrodes of said third pair of pnp transistors for supplying bias currents therein;

load circuit means connected to the collector electrodes of said second pair of pnp transistors for providing at one of the collector electrodes of said second pair of pnp transistors, differential voltage changes having a correspondence to the variations between input signals applied to said input terminals; and

output means connected to the collector electrode of one of said second pair of pnp transistors for deriving said differential voltage changes as an output signal of said differential amplifier.

4,059,809

DIFFERENTIAL AMPLIFIER

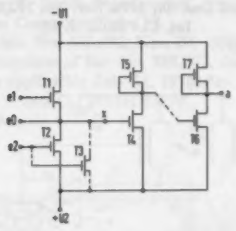
Frithjof V. Sichart, Munich, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Aug. 25, 1975, Ser. No. 607,586
Claims priority, application Germany, Aug. 27, 1974, 2440937
Int. Cl.[2] H03F 3/45
U.S. Cl. 330—253 6 Claims

1. A differential amplifier, comprising:

supply voltage means,

first and second metal oxide semiconductor (MOS) transistors of, respectively, the depletion and enhancement types, the source-drain paths of said transistors being connected in series at a common junction point such that the source terminal of said first transistor is connected to the drain terminal of said second transistor, the other terminals of said source-drain paths being connected to said supply voltage means, said transistors having control electrodes connected, respectively, directly to separate input voltages the difference between which is to be indicated and



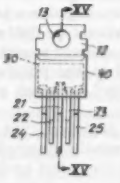
output terminal means connected to said common junction point for producing differential voltages corresponding to the difference between said input voltages.

4,059,810

RESIN-ENCASED MICROELECTRONIC MODULE

Raimondo Paletto, Milan, Italy, assignor to SGS-ATES Componenti Elettronici SpA, Milan, Italy

Continuation-in-part of Ser. No. 508,951, Sept. 23, 1974. This application Mar. 29, 1976, Ser. No. 671,374
Claims priority, application Italy, Sept. 26, 1973, 29390/73
The portion of the term of this patent subsequent to June 28, 1994, has been disclaimed.
Int. Cl.[2] H05K 5/00
U.S. Cl. 330—65 5 Claims



1. A microelectronic module comprising:

a sheet-metal plate with an upper and a lower face;

a five-terminal power amplifier in the form of a semiconductive chip supported on the upper face of said plate, one of the terminals of said amplifier being constituted by said plate;

a set of conductive tongues including a central tongue conductively and mechanically secured to said plate, a pair of intermediate tongues flanking said central tongue, and a pair of outer tongues flanking said intermediate tongues, said intermediate and outer tongues being respectively connected to the other four terminals of said amplifier; and

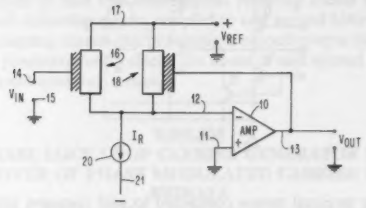
a resinous body encasing said chip and three sides of said plate while leaving the lower face thereof exposed, said tongues being partly imbedded in said body and having portions projecting generally parallel to one another from a side of said body, said projecting portions being alternately bent upwardly and downwardly outside said body to increase the spacing of their free ends;

said plate having an edge confronting said tongues and forming an upwardly open median recess, said central tongue having a downwardly bent encased extremity received in said recess, said intermediate tongues having T-shaped encased ends offset from said encased extremity, said outer tongues having outwardly pointing L-shaped encased ends offset from said T-shaped ends.

4,059,811
INTEGRATED CIRCUIT AMPLIFIER

Charles Reeves Hoffman, Raleigh, N.C., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 20, 1976, Ser. No. 752,958
Int. Cl.[2] H03F *3/16*
U.S. Cl. 330—277 1 Claim



1. An amplifier for incorporation on a semiconductor chip with other circuits in integrated circuits, said amplifier having a high impedance to an input signal, a low current signal feedback circuit and having an overall signal gain substantially equal to a design value over a wide range of production parameters and including:

a high gain circuit having an input terminal, a reference voltage input terminal, and an output terminal, the signal on said output terminal being substantially larger than and inverted with respect to a signal applied to said input terminal;

a power supply having a positive voltage side, a negative voltage side and a reference zero level connection to said high gain circuit;

a constant current regulating device connected between said input terminal and the negative side of said power supply;

a first n-channel, depletion type field effect transistor having a source terminal connected to said input terminal, a drain terminal connected to the positive side of said power supply and a control terminal connected to a signal source; and

a second n-channel, depletion type field effect transistor having a source terminal connected to said input terminal, a drain connection connected to the positive side of said power supply and a control terminal connected to said amplifier's output terminal; said second transistor having a width-to-length ratio different from the width-to-length ratio of said first transistor such that a gate voltage change which is the product of that of said first transistor multiplied by said value of said overall signal gain is required to produce the same change of current in said second transistor as is produced in said first transistor by said gate voltage change whereby, said constant current regulating device, said first field effect transistor, said second field effect transistor and said high gain circuit coact to maintain the voltage level of said input terminal at a virtual level essentially equal to said reference level voltage applied to said reference voltage input terminal.

4,059,812
SYNCHRONOUS PULSE GENERATOR INCLUDING FLYWHEEL TANK CIRCUIT WITH PHASE LOCKED LOOP

Samuel Anderson Procter, Minneapolis, Minn., assignor to Control Data Corporation, Minneapolis, Minn.

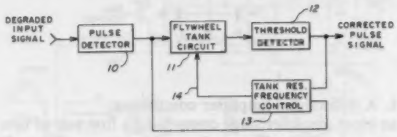
Filed Nov. 22, 1976, Ser. No. 743,891
Int. Cl.[2] H03B *3/04*
U.S. Cl. 331—1 A 8 Claims

1. Apparatus receiving a degraded synchronous pulse signal and supplying a corrected data pulse signal in which missing pulses have been replaced and phase shifted pulses have been properly positioned, comprising:

a. a flywheel tank circuit whose resonant frequency varies responsive to a frequency control signal, which produces an oscillating output signal whose amplitude remains above a pre-selected value responsive to an in-phase substantially synchronous pulse train at a pulse train input and which decays to less than the predetermined value within a predetermined number of cycles upon cessation of the in-phase synchronous pulse train;

b. a pulse detector receiving the degraded pulse signal and supplying a pulse to the pulse train input of the flywheel tank circuit at a selected time following each crossing of a pre-selected level in a pre-selected direction by the degraded data pulse signal;

c. a threshold detector receiving the output of the flywheel tank circuit and producing the corrected data pulse signal



having first and second values respectively as the flywheel tank circuit output signal is greater and less than a pre-selected value;

d. a first one-shot receiving the pulse detector output, and having an on time substantially less than the shortest time between the start of adjacent pulses of the degraded data pulse signal;

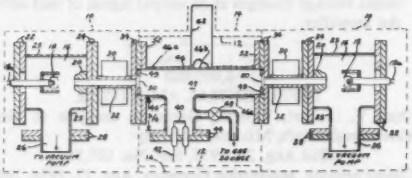
e. an exclusive OR circuit receiving as inputs the output of the first one-shot and the threshold detector; and

f. a first integrator circuit receiving the exclusive OR circuit output and a second integrator circuit receiving the output of the first, and supplying its output to the flywheel tank circuit as the frequency control signal.

4,059,813
COHERENT COUNTER-STREAMING ELECTROSTATIC WAVE RAMAN INTERACTION SYSTEM UTILIZING OPPOSING ELECTRON BEAMS FOR THE PRODUCTION OF COHERENT MICROWAVES IN PLASMAS

Clare C. Leiby, Jr., 229 Old Billercia Road, Bedford, Mass. 01730, and Balram Prasad, 56 William St., West Newton, Mass. 02165

Filed Jan. 12, 1977, Ser. No. 758,877
Int. Cl.[2] H03B *17/00*
U.S. Cl. 331—94 7 Claims



1. A method of generating controlled, coherent microwave radiation from a warm, uniform plasma at approximately twice the plasma frequency comprising the steps of

counter-streaming a pair of electron beam sources into a plasma to excite longitudinal waves in the plasma such that the energy density level of the said waves is sufficient to stimulate transverse electromagnetic wave radiation at approximately twice the plasma frequency, and

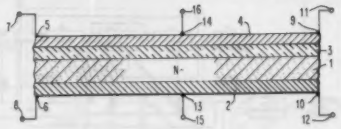
coupling said electromagnetic energy for use in appropriate circuitry.

4,059,814

CONTROLLABLE SEMICONDUCTOR ELEMENT

Otto G. Folberth, Boblingen, Germany, assignor to International Business Machines Corporation, Armonk, N.Y.

Filed June 23, 1975, Ser. No. 589,303
Claims priority, application Germany, Aug. 14, 1974, 2439051
Int. Cl.[2] H03H *7/22, 7/30;* H03C *1/36, 3/22*
U.S. Cl. 333—29 5 Claims



4. Controllable semiconductor element comprising:

a laminar circuit system with a lamination sequence consisting of a conductive layer, a semiconductor layer, an insulation layer, and finally a conductive strip;

the said conductive strip is interrupted and forms separately addressable electrodes;

means for applying an input signal at one end of said circuit system between the said conductive strip and said conductive layer;

means for deducting an output signal at the other end of the said circuit system between the said conductive strip and the said conductive layer; and

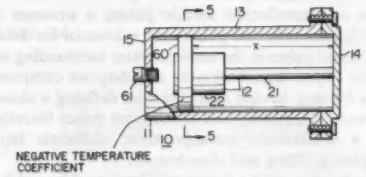
control means connected to said conductive layer and said conductive strip which, by means of conductivity modulation, with a control frequency lower than the dielectric relaxation frequency the transit time of the signal guided via the said semiconductor layer can be controlled.

4,059,815

COAXIAL CAVITY RESONATOR

Mitsuo Makimoto, and Sadahiko Yamashita, both of Kawasaki, Japan, assignors to Matsushita Electric Industrial Co., Limited, Japan

Filed July 30, 1976, Ser. No. 710,207
Claims priority, application Japan, July 31, 1975, 50-94031; July 31, 1975, 50-94032
Int. Cl.[2] H01P *1/30, 7/04*
U.S. Cl. 333—82 BT 10 Claims



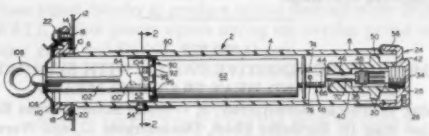
1. A cavity resonator comprising, an enclosure having opposed ends, a center cylindrical conductive body in the enclosure and shaped into first and second portions having respective characteristic impedances, the first portion being in short-circuit connection with one of said ends of the enclosure and having a larger characteristic impedance than said second portion, said second portion being in open-circuit relation with the other end of the enclosure, and a body of dielectric material encircling said second portion of the center conductive body, the dielectric constant of said material having a negative temperature coefficient.

4,059,816

ELECTRICAL LOADBREAK FUSE AND CANISTER ASSEMBLY

Thayer A. Bonecutter; Charles E. Lewis, both of Zanesville, Ohio, and John E. Smith, Nacogdoches, Tex., assignors to McGraw-Edison Company, Elgin, Ill.

Continuation of Ser. No. 633,692, Nov. 20, 1975, abandoned, which is a continuation of Ser. No. 545,782, Jan. 31, 1975, abandoned. This application July 21, 1976, Ser. No. 707,709
Int. Cl.[2] H01H *85/38*
U.S. Cl. 337—278 12 Claims



1. An electrical loadbreak, fuse and canister assembly comprising:

a fuse and contact assembly including,

1. an elongated fuse having first and second ends including conductive portions between which the fuse extends, and to which the fuse element is electrically connected;
2. a first non-loadbreak contact supported on and electrically connected to said first end of said fuse;
3. an elongated insulator having first and second ends, said first end being secured to said first end of said fuse;
4. a cap and operating means secured to the second end of said insulator;
5. a first loadbreak contact electrically connected to and projecting from said second end of said fuse, and having a contact engaging conductive portion and a tip formed of insulating material;
6. a barrier of insulating material supported between said contact engaging conductive portion of said first loadbreak contact and said second end of said fuse;

B. an enclosure and mounting assembly including,

1. a tube of insulating material having first and second ends forming an enclosure;
2. a mounting means for said assembly secured to said first end of said tube;
3. a second non-loadbreak contact having a contact portion adjacent the inner wall of said tube and positioned to be engaged by said first non-loadbreak contact, and having an electrical connection portion extending through the wall of said tube for making external electrical connection thereto;
4. a closure and loadbreak contact assembly secured to said second end of said tube including:
   a. a closure means closing said second end of said tube;
   b. a second loadbreak contact supported at one end and having a free end projecting into said tube for engagement with said first loadbreak contact,
   c. electrically conductive means connected to said second loadbreak contact and extending through said closure means for making external electrical connection to said second loadbreak contact;
   d. an insulating sleeve supported at one end on said closure means and having a free end projecting into said tube, said sleeve surrounding and spaced from said first loadbreak contact assembly, and spaced from the inner wall of said tube, the free end of said sleeve extending beyond the free end of said second loadbreak contact having a bore of reduced cross-sectional area, the outer wall of said sleeve intermediate its length being provided with a portion of enlarged cross-sectional area so as to be closely spaced from the inner wall of said tube:

whereby gases generated by an arc established between said first and second loadbreak contacts are first confined within

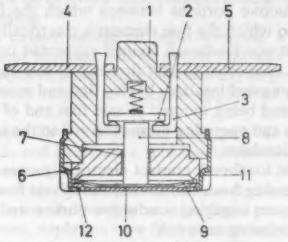
said sleeve and then pass out of said bore of reduced cross-sectional area and are thereafter substantially confined to the volume defined by said barrier, the perimeter of which is closely spaced from the inner wall of said tube, said sleeve portion of enlarged cross-sectional area and the inner wall of said tube therebetween, the gases being cooled by impingement with said confining members such that as said fuse and contact assembly is removed from said enclosure, said hot gases do not escape from said enclosure around said fuse, nor do they contact said fuse, whereby said arc is extinguished without the escape of gases from said confined volume during a loadbreak operation.

4,059,817

TEMPERATURE SENSITIVE SWITCH WITH SEPARATE BIMETAL AND HEAT TRANSFER MEANS

Walter Hollweck, Dormitzerstr. 3; Wilhelm Schnee, Franz Reichel Ring 16; Karlheinz Eberl, Dunanstrasse 33, and Werner Basel, Am Steig 14, all of D-8500 Nurnberg, Germany

Filed Dec. 19, 1975, Ser. No. 642,567
Claims priority, application Germany, Dec. 21, 1974, 2460860
Int. Cl.[2] H01H *37/54*
U.S. Cl. 337—365 **9 Claims**



1. A temperature sensitive switch comprising :
a. a switch housing containing at least a pair of switch contacts,
b. an arched bimetal disc, whose dome height changes under temperature influence,
c. a guiding disc with a centrally located and freely movable transfer pin, which transfers movements of the bimetal disc to at least one of said switch contacts to effect relative movement thereof with respect to said other contact,
d. a potlike support mounted on said switch housing, and
e. a heat transfer plate having predetermined heat transfer characteristics placed between guiding disc and said potlike support, and characterized by an opening at the bottom of said potlike support, to allow direct heat access to the heat transfer plate.

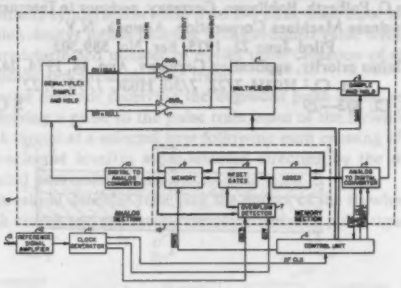
4,059,818

PERIODIC WAVEFORM INTERFERENCE ELIMINATOR

Richard J. Kostelnicek, Houston, Tex., assignor to Exxon Production Research Company, Houston, Tex.

Filed Apr. 19, 1976, Ser. No. 678,010
Int. Cl.[2] G01V *1/36*; H03B *1/04*
U.S. Cl. 340—15.5 DP **11 Claims**

1. An iterative method for reducing the amplitude of an unwanted periodic signal in an electrical signal which may include a data signal, which comprises:
a. generating a nulling signal having a period slightly less than the period of the unwanted periodic signal;
b. subtracting said nulling signal from said electrical signal to generate an error signal;
c. sampling the amplitude of the error signal at discrete intervals;
d. combining a fraction of each discrete sample of the error signal with the corresponding portions of the nulling signal to generate an updated nulling signal;



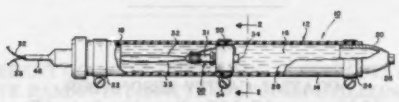
e. repeating steps (b) – (d) a plurality of times wherein the updated nulling signal replaces the nulling signal during each repetition.

4,059,819

DETECTOR ASSEMBLY FOR SEISMIC MARINE SURVEY

John C. Mollere, Nassay Bay, Tex., assignor to Hercules Incorporated, Wilmington, Del.

Continuation-in-part of Ser. No. 115,360, Feb. 16, 1971, abandoned. This application Apr. 25, 1973, Ser. No. 354,269
Int. Cl.[2] H04B *13/00*
U.S. Cl. 340—8 LF **9 Claims**



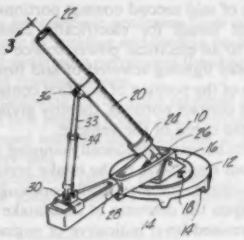
1. In an apparatus for marine seismic prospecting in a body of water having a seismic vessel towing a gun adapted to initiate explosively-operated charges at a sufficient depth below the water's surface to thereby create in the water high-pressure, acoustic pulses which produce reflected seismic pulses and unreflected seismic pulses, a streamer cable for detecting the reflected pulses, and a detector for detecting the unreflected pulses in the ambient water surrounding said detector, the improvement wherein said detector comprises:
a. a housing having a flexible wall defining a chamber, said wall transmitting said unreflected pulses therethrough,
b. a substantially-incompressible, dielectric liquid completely filling said chamber,
c. a detector probe completely immersed in said liquid, said probe comprising: a metallic housing, a quartz crystal mounted on an inner wall portion of said metallic housing, am amplifier in said metallic housing, and circuit means coupling said quartz crystal to the input circuit of said amplifier,
d. a direct-current source on said vessel, a long cable for supplying direct-current from said source to said amplifier; and
e. recorder means on said vessel, said recorder being A-C coupled to said amplifier through said cable for recording the output pules from said corresponding to said unreflected seismic pulses.

4,059,820

SEISMIC WAVE GENERATOR AND METHOD OF GEOPHYSICAL PROSPECTING USING THE SAME

Roger M. Turpening, Howell, Mich., assignor to Environmental Research Institute of Michigan, Ann Arbor, Mich.

Filed Nov. 21, 1975, Ser. No. 634,146
Int. Cl.[2] G01V 1/10
U.S. Cl. 340—15.5 SW 21 Claims



1. A device for generating seismic waves comprising: a base plate adapted to be supported on the earth; an elongated barrel having an open end and a closed end; adjustable support means for affixing the closed end of the barrel to the base plate so that the barrel projects at an angle of at least about 15° with respect to the base; means for containing water in a volume of the barrel spaced from the closed end; means for supporting an explosive charge in the volume between the closed end of the barrel and said means for containing water; and means for detonating said charge, whereby the recoil imposed on the base will force the base against the earth generating seismic waves.

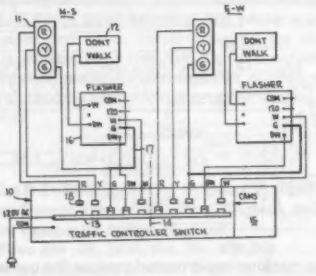
13. The method of geophysical prospecting comprising: impacting a first point on the earth at least twice at different angles relative to the earth's surface with a force to create therefrom simultaneous longitudinal and shear seismic waves in the earth; recording both the longitudinal and shear waves resulting from the impacts at a second point, remote from the first point; and mathematically operating upon the resulting recordings to separate components attributable to the longitudinal and the shear waves generated by said impact.

4,059,821

TRAFFIC SIGNAL CONTROLLER FLASHER FOR PEDESTRIAN CLEARANCE

Joseph A. Nicholls, 1729 Westwood Drive, Twinsburg, Ohio 44087

Filed Sept. 8, 1976, Ser. No. 721,498
Int. Cl.[2] G08G 1/00
U.S. Cl. 340—44 5 Claims



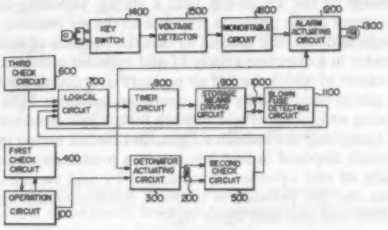
3. A modular traffic signal controller unit operable from an a-c line for converting to a flashing mode a traffic signal system sequencing traffic signals through red, green, and yellow phases and pedestrian signals through WALK and DONT-WALK phases with the DONT-WALK phase partly overlapping the green phase, consisting in combination, isolator inputs for deriving WALK, DONT-WALK and green phases from said system, a counter responsive to the a-c line frequency enabled by the green phase to divide it down thereby obtaining an on-off flashing signal preferably exhibiting in the order of 55 flashes per minute, logic AND circuitry producing an output DONT-WALK phase signal responsive conjointly to the flashing signal and the input DONT-WALK phase, an a-c line input, and solid state pedestrian signal lamp power drivers operable from said line input and the output DONT-WALK phase signal thereby to produce output flashing of the DONT-WALK output power signals during the overlap period of the input green and DONT-WALK phases.

4,059,822

FAULT DETECTING SYSTEM FOR VEHICLE OCCUPANTS PROTECTIVE APPARATUS

Toru Toshioka, Toyota; Kazuo Oishi, Oobu, and Takashi Yamada, Anjo, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota and Nippon Soken, Inc., Nishio, both of, Japan

Continuation-in-part of Ser. No. 348,533, April 6, 1973, abandoned. This application Aug. 11, 1975, Ser. No. 603,503
Claims priority, application Japan, Apr. 10, 1972, 47-35933
Int. Cl.[2] B60R 21/02; G08B 29/00
U.S. Cl. 340—52 H 9 Claims



1. In a vehicle occupants protective apparatus having an operation circuit for radiating an electromagnetic wave, receiving the electromagnetic wave reflected from a target body and combining said radiated wave and said reflected wave to generate a detection signal indicative of a vehicle collision, and an actuating circuit, connected to said operation circuit, for actuating an occupants protector means in response to said detection signal, a fault detecting system comprising:

a first check circuit, connected to said operation circuit, for applying a pseudo signal of fixed frequency thereto to thereby continuously check an occurrence of a fault of said operation circuit;

a second check circuit for checking an occurrence of a fault of at least one function of said vehicle occupants protective apparatus;

a logical circuit, connected to said first and second check circuits, for generating an indication signal while at least one of the fault occurrences are being detected by said first and second check circuits;

an indicator means, connected to said logical circuit, for indicating an occurrence of a fault in response to said indication signal;

a timer circuit, connected to said logical circuit, for generating a timer signal representing that duration of said indication signal has exceeded a predetermined time;

a storage means, connected to said timer circuit, for memorizing the generation of said timer signal irrespectively of expiration of said timer signal; and

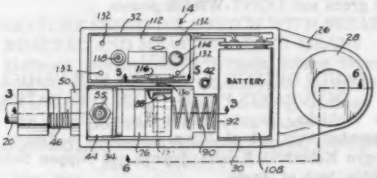
a prohibition circuit, connected between said storage means and said actuating circuit, for preventing the operation of said actuating circuit while said storage means memorizes

the generation of said timer signal, whereby said occupants protector means is maintained irresponsive to said detection signal while at least one fault exists.

4,059,823
TIRE PRESSURE INDICATOR

Clyde J. Martin, Cincinnati, and Floyd A. Nicholson, Mount Clemens, both of Mich., assignors to Tyrspy Inc., Detroit, Mich.

Filed Jan. 17, 1977, Ser. No. 759,820
Int. Cl.[2] B60C *23/04*
U.S. Cl. 340—58 **20 Claims**

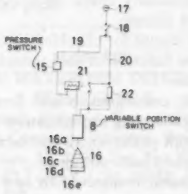


1. A tire pressure indicator comprising a housing having means thereon for attaching it to a vehicle wheel, a cylinder in said housing, a piston slideable axially in said cylinder, a switch actuator supported by said piston for movement therewith, means on said cylinder adapted to be connected with the valve stem of a vehicle tire for subjecting one side of the piston to the pressure of the air in the tire, a spring yieldably opposing movement of the piston in response to the air pressure exerted against said one side thereof so that the position of said switch actuator in a direction axially of said cylinder is determined by the extent to which the tire air pressure overcomes the force on the piston produced by said spring, an indicator light on said housing and means in said housing forming an electrical circuit for energizing the indicator light, said circuit means including a switch disposed in said housing in a predetermined position axially of said cylinder for actuation by said switch actuator when the tire pressure is below a predetermined value and thereby energize said signal light.

4,059,824
AUTOMOTIVE LIGHT FOR PREVENTING REAR END COLLISION

Kiyotaka Tanimura, 5-2, Hama-cho 1-chome,, Odawara, Kanagawa, Japan

Filed Aug. 25, 1976, Ser. No. 717,558
Claims priority, application Japan, June 12, 1976, 51-68859
Int. Cl.[2] B60Q *1/26*
U.S. Cl. 340—71 **3 Claims**



1. A vehicular light assembly for indicating the speed of movement of a vehicle and for indicating engine braking of the vehicle, said assembly comprising:

a lamp including at least three first color lights and at least three second color lights;

first switch means responsive to the relative position of the accelerator pedal of the vehicle, said first switch means comprising first and second contacts, a plurality equal to the number of first color lights of first contact portions one each electrically connected to a respective one of said first color lights, and a plurality equal to the number of second color lights of second contact portions one each electrically connected to a respective one of said second color lights, said first and second contacts being movable between and relative to said first and second contact portions as a function of the position of the accelerator pedal of the vehicle, with said first contact electrically contacting a respective one of said first contact portions and said second contact electrically contacting a respective one of said second contact portions;

first circuit means for electrically connecting said first contact to an electrical power source of the vehicle and for thereby lighting selected of said first color lights as a function of the position of said first contact with respect to said first contact portions, thereby giving a visual indication of the speed of the vehicle;

second switch means, electrically coupled to said first circuit means and responsive to the intake pressure of the engine of the vehicle, for electrically opening said first circuit means upon the decrease of said intake pressure below a predetermined level indicative of engine braking and for thereby extinguishing all of said first color lights;

second circuit means for electrically connecting said second contact to the electrical power source of the vehicle and for thereby lighting selected of said second color lights as a function of the position of said second contact with respect to said second contact portions;

a relay electrically coupled to said first circuit means and responsive to opening or closing thereof by said second switch means;

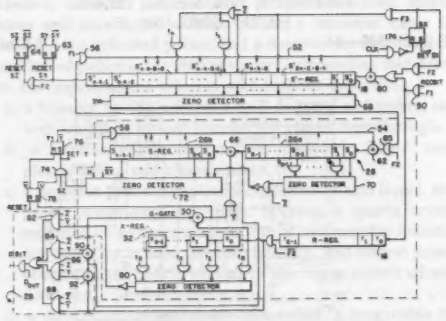
said second circuit means including relay switch means responsive to and operable by said relay for opening said second circuit means when said first circuit means is closed and for closing said second circuit means when said first circuit means is open; and

dimming resistor means, electrically coupled to said second circuit means in parallel with said relay switch means, for electrically coupling said second contact with the vehicle electrical power source when said second circuit means is opened and for lighting said selected second color lights at a dimmed intensity.

4,059,825
BURST/SLIP CORRECTION DECODER AND METHOD

Edward P. Greene, 19 Lakeside Drive, Greenbelt, Md. 20770

Filed Oct. 12, 1976, Ser. No. 731,837
Int. Cl.[2] G06F *11/12*
U.S. Cl. 340—146.1 D **10 Claims**



1. In a machine implemented process for use in a data communications system having decoding apparatus for decoding on a first-in-first-out basis n' received data characters encoded in a shortened cyclic block code of the type (n,k), n being the total number of characters and k being the number of information characters, by the use of a generating polynomial having

an exponent E, the received data characters having been subjected to an error inducing environment such that the data can contain a burst error of b characters having a slip error of d characters, the process comprising the steps of:

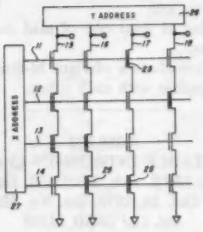
1. determining the slip error d of the received characters;
2. storing the received n' characters in a first register means;
3. generating and storing an initial syndrome in a second register means, said initial syndrome being computed using the generating polynomial and the received data characters;
4. generating an intermediate syndrome from said generated initial syndrome by rotating and feeding back pursuant to the syndrome generating polynomial the characters stored in said second register means;
5. selectively combining parts of the received n' characters stored in said first register means with selected characters of said generated intermediate syndrome to generate further characters; and
6. testing said generated further characters to determine if said received data characters have undergone a burst error.

4,059,826

SEMICONDUCTOR MEMORY ARRAY WITH FIELD EFFECT TRANSISTORS PROGRAMMABLE BY ALTERATION OF THRESHOLD VOLTAGE

Gerald D. Rogers, Houston, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 29, 1975, Ser. No. 645,173
Int. Cl.² G11C *11/40, 17/00*
U.S. Cl. 365—104 **9 Claims**



1. A semiconductor memory comprising:

a. an array of rows and columns of memory cells on a face of a semiconductor body;

b. an MOS transistor included in each of said memory cells, each MOS transistor having gate, source and drain regions and a channel region, insulator material above the channel region and beneath the gate being much thinner than surrounding insulator material on said face;

c. selected ones of the channel regions of the MOS transistors being implanted with conductivity-detemining imputities to a depth much less than that of the source and drain regions and to an extent whereby the threshold voltage is substantially zero and the source and drain regions are essentially shorted together at zero volts on the gate, to thereby permanently program certain cells of the memory.

4,059,827

MOLECULAR INFORMATION STORAGE SYSTEMS

Dennis William George Byatt, Chelmsford, England, assignor to The Marconi Company Limited, England

Filed Feb. 19, 1976, Ser. No. 659,560
Claims priority, application United Kingdom, Mar. 13, 1975, 10493/75
Int. Cl.² G11C *11/46*
U.S. Cl. 365—126 **10 Claims**

3. Apparatus for recording data on thermoplastic film consisting of polyvinylidene flouride having a random orientation of its polar molecules including generating means for generating an electric potential which is modulated in accordance with the data to be stored, means for transporting the thermoplastic film relative to the generating means so as to record the data thereon, means for heating the thermoplastic film prior to

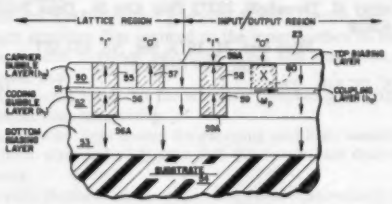
recording whereby said polar molecules are reoriented by said generating means to record the data as potential differences across the surface of said film; and means for cooling the thermoplastic film after recording has taken place to retain said potential differences.

4,059,828

BUBBLE LATTICE FILE STRUCTURE

Tsutomu Kobayashi, Placentia; John L. Archer, Orange, and Michael T. Elliott, Balboa Island, all of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Aug. 20, 1976, Ser. No. 715,967
Int. Cl.² G11C *19/08*
U.S. Cl. 365—32 **9 Claims**



1. In a magnetic bubble domain storage apparatus,

a first layer of magnetic bubble domain material for supporting carrier magnetic bubble domains,

a second layer of magnetic bubble domain material for supporting coded magnetic bubble domains which are coupled to said carrier magnetic bubble domains,

a first biasing layer supporting said second layer of magnetic bubble domain material and for applying a first magnetic bias field to said second layer of magnetic bubble domain material to affect the coded magnetic bubble domains formed therein, and

a second biasing layer supported by at least portions of said first layer of magnetic bubble domain material in order to apply a second magnetic bias field to interact with said first magnetic bias field to affect the magnetic bubble domains formed in said first and second layers of magnetic bubble domain materials.

4,059,829

MULTI STATE MAGNETIC BUBBLE DOMAIN CELL FOR RANDOM ACCESS MEMORIES

Witold Kinsner, Hamilton, and Edward Della Torre, Toronto, both of Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

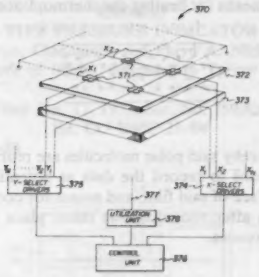
Filed Nov. 17, 1975, Ser. No. 632,803
Int. Cl.² G11C *11/14*
U.S. Cl. 365—19 **17 Claims**

1. A multi-state bubble memory cell comprising:

channel means formed in a magnetic bubble supporting material said channel means having a number of discrete energy minima positions separated by barriers to provide stable magnetic bubble positions; and

switching means for each pair of adjacent stable positions having first select current conductor means positioned

over the barrier between the two stable positions and second select current conductor means positioned adjacent to the two stable positions, for conducting predetermined coincident currents to produce a magnetic field in the cell for switching a magnetic bubble across the barrier from the one stable position to the other stable position.

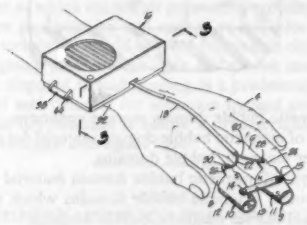


4,059,830

SLEEP ALARM DEVICE

Murray H. Threadgill, 33372 Palo Alto St., Dana Point, Calif. 92629

Filed Oct. 31, 1975, Ser. No. 627,557
Int. Cl.[2] G08B *21/00*
U.S. Cl. 340—279 16 Claims



1. A switching apparatus comprising at least two switch contacts, adapted to be worn on adjacent fingers of a human hand and adapted to close an electrical circuit when brought into mutual contact as a result of said adjacent fingers being brought into a contiguous relationship, each said contact comprising:

a ring-like device having a face portion for contacting a similar face portion on an adjacent switch contact and adapted to be removably positioned on a human finger and to be retained thereon by frictional engagement with said finger, and

means urging said face portions toward each other in opposition to muscular forcing of said fingers apart when said devices are on said two fingers.

4,059,831

PASSIVE TRANSPONDERS USING ACOUSTIC SURFACE WAVE DEVICES

Max Epstein, Highland Park, Ill., assignor to Northwestern University, Evanston, Ill.

Filed Oct. 6, 1975, Ser. No. 617,251
Int. Cl.[2] G01S *9/56*
U.S. Cl. 343—6.8 R 4 Claims

1. A transponder for receiving and for retransmitting pulsed electromagnetic energy characterized by a frequency range of from about 10 meg. Hz to 1000 meg. Hz and comprising:

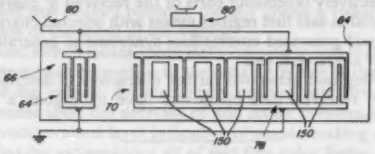
antenna means for receiving and for transmitting a signal of said pulsed electromagnetic energy,

peizoelectric substrate means remote from said antenna means,

electrode means carried as an array of electrodes on said peizoelectric substrate means to define therewith an acoustic surface wave device, said device including a plurality of interdigital transducers,

electrical energy conducting means interconnecting said antenna means with at least one of said interdigital transducers,

said transducers and said substrate means constituting means responsive to a signal received by said transducers from



said antenna means to effect a finite time delay in the conductive travel of said signal along said piezoelectric substrate means, thereby to provide a time-delayed signal,

said transducers constituting means for transmitting the time-delayed signal to said antenna means,

said transducers including a circular input transducer propagating radially and an array of output taps disposed in cyclical succession about said transducer,

said output taps being disposed on a circumference of a circular pattern, and

means connecting at least one of said output taps to said antenna means,

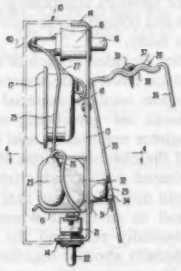
whereby said transducers obviate bi-directional radiation and are compatible with each other.

4,059,832

PORTABLE INTRUSION ALARM

LeRoy T. Conklin, 136 S. Ash, Blackfoot, Idaho 83401

Filed Oct. 24, 1975, Ser. No. 625,389
Int. Cl.[2] G08B *13/08*
U.S. Cl. 340—274 R 1 Claim



1. A portable alarm device for closures comprising a mounting plate, an alarm switch, an on-off switch and an audible electrical alarm element secured to one side of the mounting plate, a battery holder on the same side of the mounting plate and having a pair of spaced ears formed integrally thereon, the mounting plate having spaced slots receiving said ears and the ears projecting beyond the other side of the mounting plate, said battery holder having a substantially U-shaped body portion including a flat base lying against the mounting plate and being fixed thereto, said spaced ears being directly attached to said flat face at opposite sides thereof and extending substantially at right angles to the flat face and said mounting plate, said alarm switch having an actuating plunger projecting be-

yond said other face of the mounting plate, a hanger bracket for said alarm device having a plate body extending near said mounting plate, said plate body having a pair of spaced ears formed integrally therewith and interfitting laterally with the ears of the battery holder, a pintle hingedly connecting the ears of the battery holder with the ears of the plate body, a coiled torsion spring surrounding the pintle between said ears of the battery holder and having ends bearing on the mounting plate and said plate body and biasing the mounting plate pivotally in one direction relative to said hanger bracket, and said hanger bracket including a substantially right angular extension which is transversely corrugated and said extension carried by the upper end of said plate body, and a coacting L-shaped corrugated hanger extension on the hanger bracket whose corrugations interfit adjustably with the corrugations of said extension, whereby the effective width of the hanger bracket may be varied to accommodate closures of different thicknesses, and separable threaded fastener means securing the interfitting corrugations in selected adjusted positions.

4,059,833

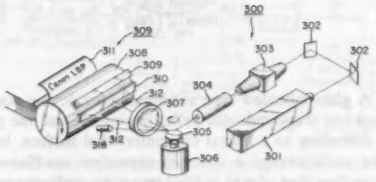
RECORDING POSITION ADJUSTER

Takashi Kitamura, Yokohama; Asao Watanabe, Higashikurume; Takashi Nakano, Yokohama; Katsumi Masaki, Kodaira; Kazuhiro Hirayama, Yokohama; Yasushi Sato, Kawasaki, and Taisuke Tokiwa, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sept. 25, 1975, Ser. No. 616,675

Int. Cl.[2] B41B *15/00*

U.S. Cl. 346—108 **22 Claims**



1. An apparatus for defining the position for initiating recording on a recording member, comprising in combination:

a. beam forming means for forming a beam modulated by record signals applied thereto;

b. deflecting means for deflecting said beam along a scanning path;

c. a member having a recording region on one portion thereof within which said record signals are recorded by the irradiation of said region with said deflected beam;

d. beam detecting means for detecting when said beam is at a predetermined position and for producing a detection output in response to the detection of said beam at said predetermined position;

e. first clock signal generating means for generating first clock signals of a predetermined frequency

f. second clock signal generating means for generating second clock signals which are synchronized with said first clock signals and which have a lower frequency than that of said first clock signals;

g. first detecting means for detecting a time period corresponding to a predetermined number of said second clock signals, wherein said time period is initiated at the next successive first clock signal after said beam detection; and

h. record signal applying means for applying said record signals to said beam forming means in response to generation of said second clock signals after the detection, by said first detecting means, of when said predetermined number of second clock signals has been generated.

4,059,834

LIGHT EXPOSING APPARATUS FOR FORMING A PHOSPHOR SCREEN OF A CATHODE RAY TUBE

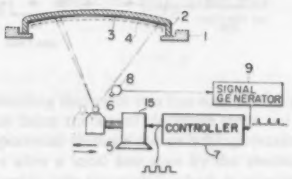
Kakuichiro Hosokoshi, Neyagawa; Hikoshi Yamamoto; Masayuki Tanaka, both of Takatsuki, and Shinichi Omura, Nagaokakyo, all of Japan, assignors to Matsushita Electronics Corporation, Osaka, Japan

Filed Mar. 10, 1975, Ser. No. 556,876

Claims priority, application Japan, Mar. 13, 1974, 49-29372; Mar. 13, 1974, 49-29373

Int. Cl.[2] G03B *41/00*

U.S. Cl. 354—1 **4 Claims**



1. In combination,

a cathode ray tube comprising

a face panel,

a shadow mask having a plurality of slots therein, and

a light sensitive film secured to the inner surface of said face panel between said face panel and said shadow mask, and

a light exposing apparatus for selectively exposing said light sensitive film comprising

an ultraviolet light source for exposing said light sensitive film to ultraviolet light through the slots in said shadow mask,

movable platform means producing relative movement to the light source and said light sensitive film in a plane parallel to said film,

means for receiving and converting part of said ultraviolet rays to corresponding first electrical signals,

signal generator means for accumulating and counting said first electrical signals to generate a second electrical signal each time the accumulated first signals reach a predetermined value, and

means for controlling said platform means to cause a stepwise relative movement of at least one of said light source and said light sensitive film in the direction of the length of the slots in said shadow mask, said movement being determined by said second electrical signal.

4,059,835

BYPASS CIRCUITS FOR IMPROVING THE RESPONSE OF ELECTRIC SHUTTERS

Masahiro Kawasaki, and Hirokazu Ando, both of Tokyo, Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Japan

Filed July 25, 1975, Ser. No. 599,006

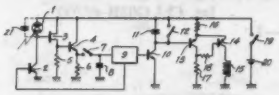
Claims priority, application Japan, July 27, 1974, 49-89964

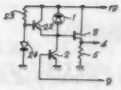
Int. Cl.[2] G03B *7/08*

U.S. Cl. 354—24 **7 Claims**

1. In an electric shutter circuit, a two terminal light receiving element capable of generating a current corresponding to a received light quantity, said element being a photodiode having anode and cathode terminals and including a junction capacitor, a logarithmic amplifier coupled to said element for providing a compressed current signal and means coupling to said amplifier a memory capacitor operative to charge to a value determined by said compressed current signal, and, for controlling the charge on said memory capacitor, an active device having an input terminal and first and second output terminals, with said first output terminal coupled to one terminal of said light receiving element and said second output terminal coupled to said other terminal of said light receiving

element, to thereby effectively shunt said element, a signal operation circuit coupled to said memory capacitor and a lead from said signal operation circuit coupled to said logarithmic amplifier to provide a feedback loop, and means separate from and unconnected to said logarithmic amplifier while being connected to said input terminal of said active device to determine the amount of current flowing between said first and second output terminals and hence, the amount of current flowing in said light receiving element and, therefore, the





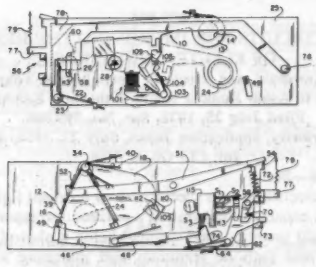
charge of said capacitor, said means coupling said memory capacitor to said amplifier including a source-follower FET coupled to said logarithmic amplifier and an emitter-follower transistor coupled between said source-follower FET and said memory capacitor, said active device, when the electric shutter circuit is set into operation, providing for discharge of said junction capacitor and providing additional current for said logarithmic amplifier for preventing cut-off of said emitter-follower transistor and dropping of the voltage of said memory capacitor to an undesirably low level.

4,059,836

EXPOSURE CONTROL MECHANISM

William Thomas Hochreiter, Rochester; Loren Jackson Craig, Springwater, and Fredric A. Mindler, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 5, 1976, Ser. No. 673,515
Int. Cl.² G03B 7/18
U.S. Cl. 354—29 **6 Claims**



1. In a camera having an adjustable mechanism to set an exposure aperture, a shutter to control exposure duration, and a member movable to actuate said shutter to open said exposure aperture to initiate an exposure, movement of said member within a predetermined initial range being ineffective to actuate said shutter to open, the improvement comprising:

means, including an electromagnet, effective upon energization and subsequent de-energization of said electromagnet for controlling said mechanism to set a desired exposure aperture and effective, when said electromagnet is energized with said shutter open, for holding said shutter open until de-energization thereof;

a photosensor exposed to scene brightness; and

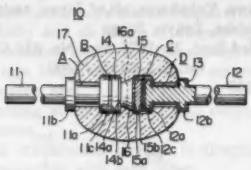
circuitry including switch means controlled by said movable member for operatively connecting said photosensor to said electromagnet, said circuitry being effective 1) to energize and then temporarily de-energize said electromagnet to establish a restricted exposure aperture setting in accordance with scene brightness during movement of said member in said initial range and 2) to re-energize said electromagnet, and after an exposure of duration related to scene brightness, to again de-energize said electromagnet.

4,059,837

GLASS-MOULDED TYPE SEMICONDUCTOR DEVICE

Kensuke Suzuki; Takeshi Sasaki, and Mitsuyuki Matsuzaki, all of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Filed Apr. 5, 1976, Ser. No. 673,530
Claims priority, application Japan, Apr. 7, 1975, 50-41293; Apr. 7, 1975, 50-41294
Int. Cl.² H01L 23/30, 23/48, 29/40
U.S. Cl. 357—73 **28 Claims**



1. A glass-moulded type semiconductor device comprising at least one semiconductor pellet having at least one p-n junction extending to a lateral circumferential surface, lead electrodes each having a thermal expansion coefficient much greater than that of said at least one semiconductor pellet and including a header portion to which said at least one semiconductor pellet can be adhesively fixed, a soft solder having a low melting point for adhesively fixing said lead electrodes to both sides of said at least one semiconductor pellet, and a mould glass having a passivation function to said at least one p-n junction of said at least one semiconductor pellet and adhesively fixed to said at least one semiconductor pellet all over the surface of its lateral circumference and having a thermal expansion coefficient substantially approximate to that of said at least one semiconductor pellet.

4,059,838

CHROMA-PREFERENCE CONTROL FOR VIR AUTOMATIC OPERATION

Robert O. Banker, Portsmouth, and Howard E. Holshouser, Suffolk, both of Va., assignors to General Electric Company, Portsmouth, Va.

Filed Sept. 24, 1976, Ser. No. 726,182
Int. Cl.² H04N 9/535
U.S. Cl. 358—27 **7 Claims**

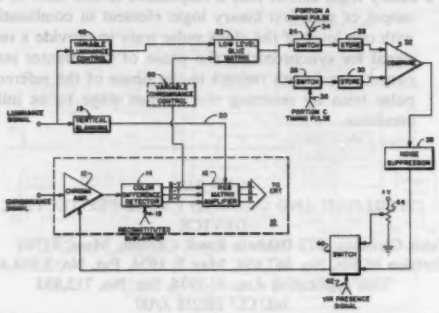
1. In a color television receiver, an automatic saturation control circuit responsive to a VIR signal comprising:

means for providing a luminance signal,

means for providing a color difference signal from a chrominance signal,

control means responsive to both said luminance signal and said color difference signal during receipt of said VIR signal for governing the chrominance to luminance matrix ratio of said receiver, and

means to enable a viewer to preferentially control the level of at least one of said luminance and said color difference



signals to vary said chrominance to luminance matrix ratio.

4,059,839

SOLID STATE CAMERA

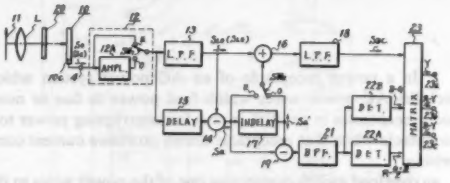
Seisuke Yamanaka, Mitaka, and Fumio Nagumo, Koshigaya, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Feb. 9, 1976, Ser. No. 656,299

Claims priority, application Japan, Feb. 14, 1975, 50-18593

Int. Cl.[2] H04N 9/07

U.S. Cl. 358—44 **7 Claims**



1. A solid state color camera employing a solid state image receiving device having a plurality of picture elements aligned in both horizontal and vertical directions, comprising:

a. means for projecting an image of an object on said solid state image receiving device;

b. means for developing and storing electrical information corresponding to the image displayed on said picture elements;

c. means for reading said information line-by-line in sequence; and

d. color filter means disposed between said solid state image receiving device and said image projecting means for producing a color signal component only at every other line of picture elements.

4,059,840

TELEVISION CAMERA AND PICK-UP TUBE HAVING STRIPES FOR IMPROVED RESOLUTION AND LINEARITY

Leendert Johan van de Polder, and Sing Liong Tan, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

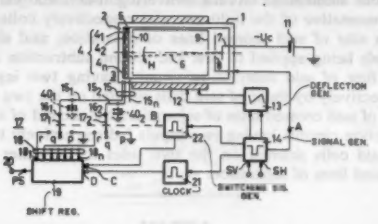
Filed Apr. 29, 1976, Ser. No. 681,548

Claims priority, application Netherlands, Feb. 11, 1976, 7601361

Int. Cl.[2] H04N 9/07, 5/30

U.S. Cl. 358—48 **15 Claims**

1. A television camera comprising a a pick-up tube including an electron gun means for generating an electron beam, and a target plate including a photo-sensitive layer to be scanned by the electron beam and a signal electrode having electrically conducting strips which are separated from each other, deflection means for providing a line scanning across successive strips by said beam, a switching circuit having parallel inputs separately coupled to the strips of the signal electrode respectively, and switches coupled to the parallel inputs, and a switching signal generator means for controlling the switches



and for providing that prior to a line scan of the target plate by the electron beam the signal electrode strips are coupled to a reference potential through the switching circuit and for providing that after a local line scan by the electron beam of a signal electrode strip the switch which is coupled to the associated parallel input is closed for providing information.

4,059,841

OPTICAL READ-OUT SYSTEM INCLUDING ASYMETRICAL BEAM INTENSITY AND FOUR DETECTOR CELLS

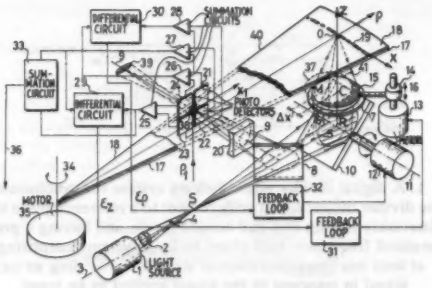
Claude Bricot, and Jean-Claude Lehureau, both of Paris, France, assignors to Thomson-Brandt, Paris, France

Filed Sept. 24, 1976, Ser. No. 726,161

Claims priority, application France, Sept. 29, 1975, 75.29707

Int. Cl.[2] H04N 5/76; G11B 7/12

U.S. Cl. 358—128 **22 Claims**



1. Optical readout system for optically reading a recording in the form of a support carrying a track of substantially constant width arranged in a reading surface; said track being made of a string of information items having non-uniform length and spacing, said information items ensuring by an alternative modification of a physical characteristic of said reading surface, the transcription of an angularly modulated waveform carrying the information stored in said recording; said optical readout system comprising: a source of coherent light, a lens arranged for causing said coherent light to converge into a reading spot illuminating a single area of said track extending across said width and photodetector means arranged for collecting, through said lens, a fraction of the modulated light emerging from said single area; the spatial distribution of the luminous intensities of the light beam incident upon the aperture of said lens being rendered asymmetrical in a direction coinciding with the direction of scanning of said track by said reading spot; said photodetector means comprising four cells arranged respectively along the quadrants of a detection

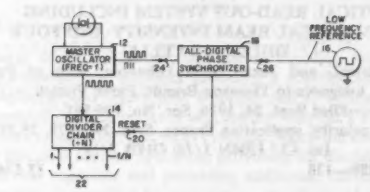
plane; the crossed lines of separation of said quadrants forming a rectangular trihedron with the optical axis of said lens; one of said crossed lines of separation being oriented in said direction of scanning; each pair of said cells pertaining to two contiguous portions of said quadrants being electrically connected to a summation circuit; said summation circuit belonging to a set of four summation circuits delivering four electrical signals representative of the light energies respectively collected on each side of said crossed lines of separation; said electrical signals being applied to first and second subtraction circuits; the first of said subtraction circuits having two inputs fed respectively by those of said cells situated on the two sides of one of said crossed lines of separation; the second of said subtraction circuits having two inputs fed respectively by those of said cells situated on the two sides of the other of said crossed lines of separation.

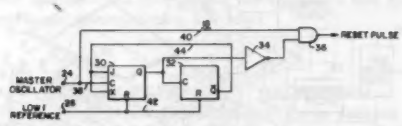
4,059,842

METHOD AND APPARATUS FOR SYNCHRONIZING A DIGITAL DIVIDER CHAIN WITH A LOW FREQUENCY PULSE TRAIN

James H. Meacham, Laurel, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 31, 1975, Ser. No. 627,735
Int. Cl.² H04N 5/06; H03F 3/42, 3/68; H03K 1/17
U.S. Cl. 358—150 **20 Claims**





1. A digital divider phase locking system for synchronizing the divider output signal with respect to a reference pulse train alternately having first and second levels, and having a predetermined frequency, said phase locking system comprising:

at least one resettable counter stage for providing an output signal in response to the signal applied to an input;

a source for providing a clock pulse train alternately having first and second levels, and having a higher frequency than the frequency of said reference pulse train, said clock pulse train being applied to the input of the counter stage;

a first binary logic element responsive to signals provided to first, second, and third inputs to provide an output signal having alternately high and low states, said first binary logic element providing a transition between the states of the output signal in response to a transition between levels of the clock pulse train applied to the first input in combination with one level of the reference pulse train applied to the second input and a signal of one of a high or low state applied to the third input;

a second binary logic element responsive to signals provided to first and second inputs to provide an output signal having alternately high and low states, said second binary logic element providing an output signal of the other of the high or low states to the third input of said first binary logic element in response to the transition in the output signal of the first logic element applied to the first input of said second binary logic element in combination with the one level of the reference pulse train applied to the second input of said second binary logic element; and

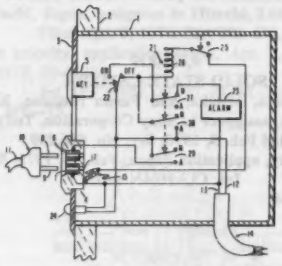
a binary logic circuit that is responsive to one state of the output of said first binary logic element in combination with one level of the clock pulse train to provide a reset signal for synchronizing the phase of the counter stage output signal with respect to the phase of the reference pulse train by resetting the counter stage to an initial condition.

4,059,843

OVERLOAD AND GROUND FAULT PROTECTIVE DEVICE

Fahir Girismen, 372 Baldwin Road, Carlisle, Mass. 01741

Division of Ser. No. 467,654, May 7, 1974, Pat. No. 3,974,492.
This application Aug. 9, 1976, Ser. No. 712,852
Int. Cl.² H02H 3/00
U.S. Cl. 361—93 **2 Claims**



1. In a power receptacle of an AC power system which includes AC power wires which feed power to one or more such receptacles in parallel, means for interrupting power to a receptacle when that receptacle draws excessive current comprising,

an overload switch connecting one of the power wires to the receptacle when said switch is actuated,

control means for actuating said switch when the control means draws current,

another switch between the power wires and the control means for energizing the control means, said other switch also having an actuated condition and being controlled by said control means,

whereby, once said control means draws current, resulting in the actuation of both of said switches, the control means remains energized and power is fed from the power wires to the receptacle, and

thereafter when the receptacle draws excessive current, current to the control means decreases so that the control means no longer actuates the switches, whereupon the switches become de-actuated cutting off power to the receptacle and current to the control means.

4,059,844

SOLENOID DRIVER CIRCUIT

John W. Stewart, Wichita, Kans., assignor to NCR Corporation, Dayton, Ohio

Filed June 4, 1976, Ser. No. 693,035
Int. Cl.² H01H 47/32
U.S. Cl. 361—152 **10 Claims**

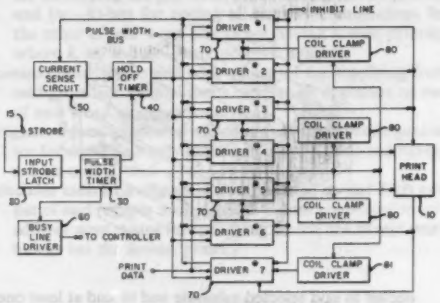
1. A solenoid drive circuit comprising:

a solenoid;

switch means for operatively connecting a source of drive voltage in circuit with said solenoid; and

means for cycling said switch means in response to the level

of current in said solenoid to disconnect the source of drive voltage from said solenoid for fixed periods of time



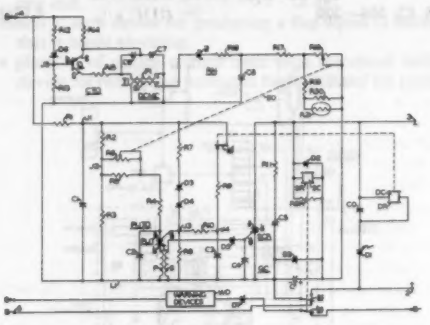
so as to maintain the level of current in said solenoid below a selected level.

4,059,845

FAIL-SAFE TIME DELAY CIRCUIT

Dick J. Kolkman, Gibsonia, Pa., assignor to Westinghouse Air Brake Company, Swissvale, Pa.

Filed May 14, 1976, Ser. No. 686,304
Int. Cl.² H01H 47/18
U.S. Cl. 361—198 **10 Claims**



1. A fail-safe time delay circuit comprising, detection means for sensing the presence and absence of an input signal on a pair of terminals, switching means connectable between said pair of input signal terminals and a pair of d.c. supply terminals, said switching means assuming a first and a second condition in accordance with the presence and absence of the input signal on said pair of input signal terminals, oscillating means connectable to said pair of d.c. supply terminals, gating means connected to said oscillating means, and d.c. making means connectable to said pair of d.c. supply terminals, and said oscillating, gating and d.c. making means controlled by the second condition of said switching means for providing a time delay period between the disappearance and the reappearance of the input signal on said pair of input signal terminals prior to said switch means reassuming the first condition.

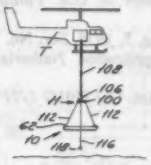
4,059,846

LIFT WITH ELECTRICAL GROUNDING MEANS

Leigh E. Eisenhauer, Van Wert, Ohio, assignor to The Eisenhauer Manufacturing Company, Van Wert, Ohio

Filed Jan. 12, 1976, Ser. No. 648,168
Int. Cl.² H05F 3/02
U.S. Cl. 361—212 **1 Claim**

1. A device for suspending a raft from a transport such as a helicopter, which device can be lowered from the transport for attachment to the raft afloat in the water without subjecting persons attending or occupying the raft to an electric shock from a static charge that may be carried by the transport, said device comprising a support formed of electrically conductive material and having a central apertured part in which the hook of a lifting cable from the transport is engageable, flexible



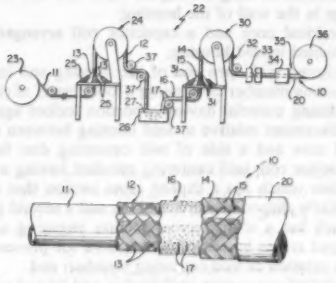
linear elements depending from the periphery of said support and releasably attachable to the raft, and a ground wire electrically connected to and depending from said support having a weight on its lower end, said ground wire being sufficiently longer than said linear elements as to contact the water and ground the transport before said linear elements contact the raft.

4,059,847

HOSE HAVING AN ELECTRICALLY CONDUCTIVE LAYER FOR DISSIPATING STATIC ELECTRICITY AND METHOD OF MAKING SAME

Alfred R. Phillips, and Arthur D. Logan, both of Waynesville, N.C., assignors to Dayco Corporation, Dayton, Ohio

Filed Sept. 1, 1976, Ser. No. 719,873
Int. Cl.² F16L 11/12; H05F 3/02
U.S. Cl. 361—215 **20 Claims**



1. A hose construction having means for dissipating static electricity and comprising, a polymeric inner tubular layer, a braided layer disposed against said inner tubular layer and comprised of a plurality of filaments, and an electrically conductive layer made of carbonaceous particles overlying said braided layer and including carbonaceous particles dispersed between said filaments, said particles being disposed in overlapped relation in layer form enabling relative movement therebetween while maintaining electrical continuity to enable dissipating said static electricity.

12. A method of making a flexible hose construction for dissipating static electricity built up thereon, said method comprising the steps of, providing a polymeric inner tube, braiding a first braided layer against said tube, placing the tube with the first braided layer thereon in contact with a dispersion containing carbonaceous particles disposed therethrough causing said carbonaceous particles to form an electrically conductive layer around said first braided layer and between filaments comprising said first braided layer, braiding a second braided layer around the electrically conductive layer to sandwich the

electrically conductive layer between said first and second braided layers, and drying the hose construction.

4,059,848

WOUND CAPACITOR COMPRISING AN EXCESS-PRESSURE SAFETY DEVICE

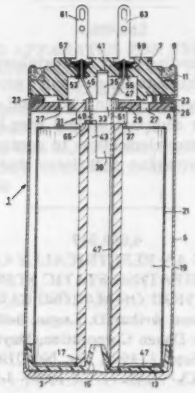
Maarten Koel, and Hubertus J. Theelen, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 5, 1976, Ser. No. 711,711

Claims priority, application Netherlands, Aug. 8, 1975, 7509465

Int. Cl.² H01G *1/11*

U.S. Cl. 361—272 **4 Claims**



1. A wound capacitor comprising

a cylindrical housing having an open end and including a ridge in the wall of the housing;

a cylindrical core and a capacitor roll arranged thereon contained in said housing;

a lid closing said open end of the housing and including a centering member comprising a loose insert of electrically insulating material having a portion locked against axial displacement relative to said housing between an end of said core and a side of said centering disc facing said capacitor roll, said centering member having a first projection which has a shpaed cross section that engages a similarly shaped recess in said lid, and a second projection which has a shaped cross section engaging a similarly shaped recess in said capacitor core for preventing relative rotation of said centering member; and

an electrical connection anchored in said lid and said centering disc for connection to a capacitor electrode.

4,059,849

INTERCONNECTED MODULE

James T. Mitchell, Lima, Ohio, assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 16, 1974, Ser. No. 533,405

Int. Cl.² H05K *5/00*

U.S. Cl. 361—395 **9 Claims**

1. A module comprising:

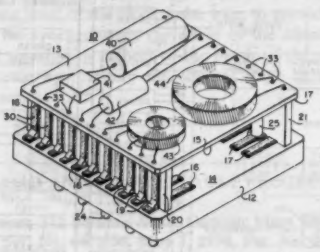
a plurality of substrates;

a conductive circuit matrix having input and output terminals disposed on each of said substrates;

at least one insulated spacing element disposed between and holding said substrates in a spaced relationship;

a plurality of conductive strips disposed upon at least one of said insulated spacing elements, said conductive strips being electrically connected to said input and output terminals of adjacent substrates; and,

a plurality of electrical connector pins disposed in electrical contact with said input and output terminals of a selected one of said substrates, said pins being mechanically connected to said selected substrate and to said at least one of said insulated spacing elements.



4,059,850

MEMORY SYSTEM WORD GROUP PRIORITY DEVICE WITH LEAST-RECENTLY USED CRITERION

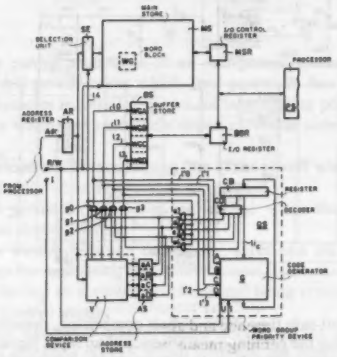
Rudolf Van Eck, Beekbergen, and Antonius Cornelis Maria Touw, Eindhoven, both of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Sept. 14, 1976, Ser. No. 723,154

Claims priority, application Netherlands, Sept. 17, 1975, 7510904

Int. Cl.² G06F *13/00*; G11C *9/06*

U.S. Cl. 364—200 **4 Claims**



1. For use with a data processing system having a processor and a storage configuration including a first store and a relatively faster second store, wherein data is organized in each of said stores in word blocks each having a predetermined number of words of data, with each of said word blocks in said second store having a relative priority at any given time assigned on the basis of the least-recently-used criterion, and the number of words in said second store being less than the number of words in said first store, the combination comprising:

means for supplying from said processor the word block address of a predetermined word block for addressing individual word blocks within said first and second stores;

means for storing said predetermined word block address;

address store means for storing addresses of word blocks stored in said second store;

comparison means for comparing said stored predetermined word block address with said addresses stored in said address store means and for producing a selecting signal on a selection line connected to said second store for selecting the addresses word block;

a code generator having an input connected to said selection

line and an output for generating an m-bit priority code for each of said word blocks, said code comprising k-bits for identifying the one word block having lowest priority and $(m-k)$-bits for coding all priority combinations for the other of said word blocks not having lowest priority, where k, m, and $m-k$ are positive integers;

means connected to said code generator for supplying from said processor a signal that a read/write operation on one of said word blocks is occurring;

register means connected to said output of said code generator for storing a newly generated priority code and having a k-bit output; and

decoder means having an input connected to said k-bit output of said register means and an output connected to said address store means for specifying which one of said word blocks has the lowest priority.

4,059,851

PRIORITY NETWORK FOR DEVICES COUPLED BY A COMMON BUS

Roy S. Nutter, Jr., Morgantown, W. Va.; Jerry R. Washburn, Alhambra, Calif., and John H. Verwys, Wichita, Kans., assignors to NCR Corporation, Dayton, Ohio

Filed July 12, 1976, Ser. No. 704,256

Int. Cl.[2] G06F 9/18

U.S. Cl. 364—200 **5 Claims**

1. A common bus system comprising:

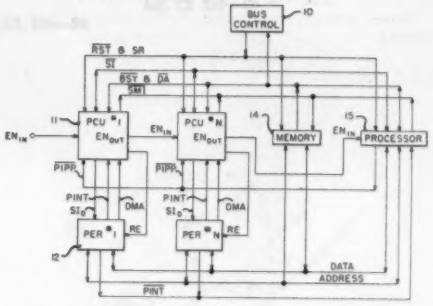
a common bus having one end;

a plurality of devices coupled to said bus, with the priority of said devices being determined by their proximity to said one end;

means at each device for producing a flag signal to indicate that it needs servicing;

a plurality of device control units each associated with a device for receiving a produced flag signal and for passing an enabling signal from the highest priority device control unit to the first device control unit receiving a flag signal and for preventing the passage of the enabling signal to all device control units having a lower priority than the first device producing a flag signal, so as to allow access to the highest priority device requesting common bus access;

a processor connected to said one end of said common bus;



a memory unit connected to said common bus; and

bus control means connected to said common bus and responsive to signals from said plurality of device control units for interrupting said processor when a device desires processor access, said bus control means also sensing the availability of said memory unit for providing a signal to said device control units permitting memory unit access.

DESIGNS

NOVEMBER 22, 1977

246,401

JACKET OR SIMILAR ARTICLE

Wolf Georg Müller-Scherak, Vincenz-Statz Str. 8, 5 Cologne 41, Germany

Filed June 17, 1975, Ser. No. 587,616

Claims priority, application Germany, Feb. 28, 1975, 43 MR 6025

Term of patent 3½ years

Int. Cl. D2—*02*

U.S. Cl. D2—191

246,402

SKIRT

Peter William Swift Morgan, Keighley, England, assignor to Dunlop Limited

Filed Feb. 12, 1976, Ser. No. 657,479

Claims priority, application United Kingdom, Aug. 13, 1975, 972177/75

Term of patent 14 years

Int. Cl. D2—*02*

U.S. Cl. D2—224

246,403

BOOK REST FOR BATHTUBS AND ARMCHAIRS

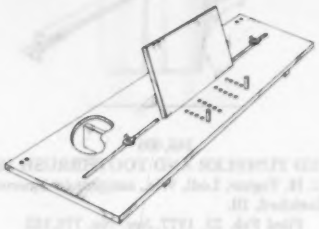
William Tempchin, 11385 Columbia Pike, No. C-1, Silver Spring, Md. 20904

Filed Aug. 9, 1976, Ser. No. 712,724

Term of patent 14 years

Int. Cl. D6—*06*

U.S. Cl. D6—86



246,404

SOAP DISH HOLDER

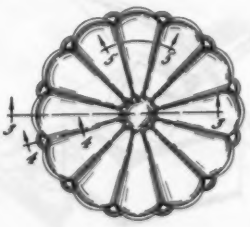
Raymond U. H. Tegner, Lodi, Wis., assignor to Amerock Corporation, Rockford, Ill.

Filed Feb. 23, 1977, Ser. No. 771,152

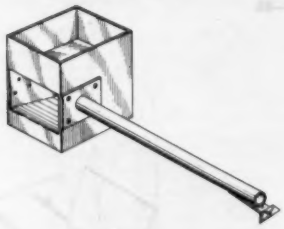
Term of patent 14 years

Int. Cl. D23—*02*; D8—*06*

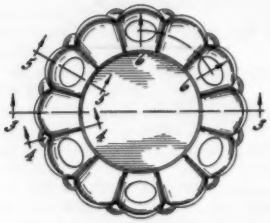
U.S. Cl. D6—89



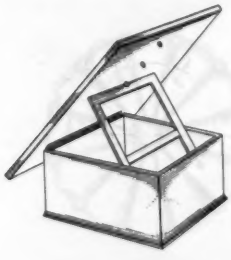
246,405
COMBINED SOAP HOLDER AND PAPER TOWEL DISPENSER
Theodore W. Richards, 1936 Sloat Blvd., San Francisco, Calif. 94116
Filed Sept. 2, 1975, Ser. No. 609,782
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D6—91



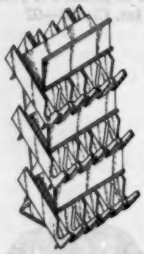
246,406
COMBINED TUMBLER AND TOOTHBRUSH HOLDER
Raymond U. H. Tegner, Lodi, Wis., assignor to Amerock Corporation, Rockford, Ill.
Filed Feb. 23, 1977, Ser. No. 771,153
Term of patent 14 years
Int. Cl. D23—*02;* D8—*06*
U.S. Cl. D6—92



246,407
TABLE
James Vance Holdam, Jr., 605 San Vincente, Apt. 110, Santa Monica, Calif. 90402
Filed Feb. 23, 1976, Ser. No. 660,165
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—179



246,408
COMBINED DISPLAY AND DISPENSING STAND
Robert R. Snediker, Winnetka, Ill.; Steve Chalmers, St. Louis, Mo., and Robert E. Drapeau, Berwyn, Ill., assignors to Brown & Williamson Tobacco Corporation, Louisville, Ky.
Filed Nov. 11, 1975, Ser. No. 631,091
Term of patent 14 years
Int. Cl. D6—*04;* D20—*02*
U.S. Cl. D6—189



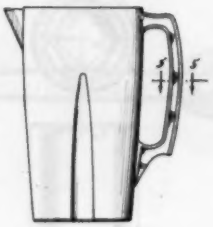
246,409
DOLL STAND
Frank D. Ventura, Commack, N.Y., assignor to Ideal Toy Corporation, Hollis, N.Y.
Filed June 23, 1976, Ser. No. 699,028
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—146

246,410
COFFEEMAKER OR THE LIKE
Wolfgang Harms, Cherry Hill, N.J.; Marshall B. Johnson, Chillicothe, Ohio; Karl H. Bergmann, and Richard G. Gelak, both of Cherry Hill, N.J., assignors to Melitta, Inc., Cherry Hill, N.J.
Filed Mar. 22, 1976, Ser. No. 669,254
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—41

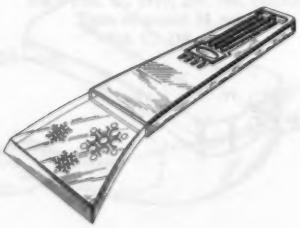
246,411
PIE CUTTER
Robert E. Blanchard, 31 Agawam Road, Rumford, R.I. 02916
Filed Feb. 17, 1976, Ser. No. 658,847
Term of patent 14 years
Int. Cl. D7—*04*
U.S. Cl. D7—43

246,412
COOKIE CUTTER OR THE LIKE
Donald A. Brunner, Pottstown, Pa., assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Apr. 7, 1976, Ser. No. 674,241
Term of patent 14 years
Int. Cl. D7—02
U.S. Cl. D7—43

246,413
PITCHER
Leo F. Wildgen, Minneapolis, Minn., assignor to Ball Corporation, Muncie, Ind.
Filed Feb. 6, 1976, Ser. No. 655,944
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—64

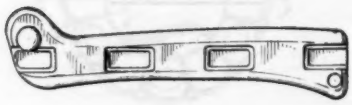


246,414
ICE AND SNOW SCRAPER
Evan Leon Hopkins, Greenville, S.C., and Donald W. Cartner, Kansas City, Mo., assignors to Hopkins Manufacturing Corporation, Emporia, Kans.
Continuation-in-part of Ser. No. 592,237, July 1, 1975, abandoned. This application May 17, 1976, Ser. No. 686,914
Term of patent 14 years
Int. Cl. D7—*05*
U.S. Cl. D7—181

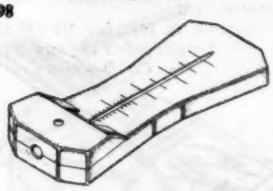


246,415
WRENCH SOCKET
John L. Critcher, 114 Bosley Ave., Cockeysville, Md. 21030
Filed Jan. 16, 1976, Ser. No. 649,868
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—29

246,416
HACKSAW BLADE HOLDER
Harald Schmidt, Kings Park, N.Y., assignor to Hansa Plastics Inc., Kings Park, N.Y.
Filed June 24, 1976, Ser. No. 699,516
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—97



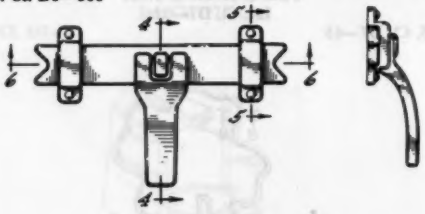
246,417
HAND-HELD TOOL FOR REMOVING INSULATION FROM ELECTRICAL CONDUCTORS
Walter N. Christiansen, Spring Lake, Mich., assignor to Gardner-Denver Company, Dallas, Tex.
Filed Sept. 27, 1976, Ser. No. 726,856
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—98



246,418
DOOR PULL HAVING SIMULATED THUMB LEVER
Keith E. Ridgway, West Covina, and Edward W. Scott, Culver City, both of Calif., assignors to Ajax Hardware Corporation, City of Industry, Calif.
Filed Jan. 13, 1977, Ser. No. 758,925
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—302

246,419
DOOR PULL HAVING SIMULATED THUMB LEVER
Keith E. Ridgway, West Covina, and Edward W. Scott, Culver City, both of Calif., assignors to Ajax Hardware Corporation, City of Industry, Calif.
Filed Jan. 13, 1977, Ser. No. 759,050
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—302

246,420
PULL
Teresa R. B. Pittenger, Rockford, Ill., assignor to Amerock Corporation, Rockford, Ill.
Filed Dec. 1, 1976, Ser. No. 746,582
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—306

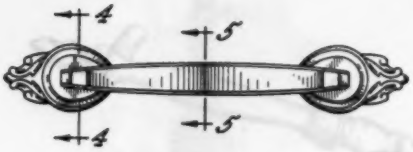


246,421
DRAWER PULL HAVING BAIL
Keith E. Ridgway, West Covina, and Edward W. Scott, Culver City, both of Calif., assignors to Ajax Hardware Corporation, City of Industry, Calif.
Filed Jan. 13, 1977, Ser. No. 759,080
Term of patent 14 years
Int. Cl. D8—06
U.S. Cl. D8—306

246,422
PENDANT PULL
LaVerne E. Clayton, Rockford, Ill., assignor to Amerock Corporation, Rockford, Ill.
Filed Dec. 1, 1976, Ser. No. 746,610
Term of patent 14 years
Int. Cl. D8—06
U.S. Cl. D8—307

246,423
RING PULL
Keith E. Ridgway, West Covina, and Edward W. Scott, Culver City, both of Calif., assignors to Ajax Hardware Corporation, City of Industry, Calif.
Filed Jan. 13, 1977, Ser. No. 759,048
Term of patent 14 years
Int. Cl. D8—06
U.S. Cl. D8—310

246,424
PULL
LaVerne E. Clayton, Rockford, Ill., assignor to Amerock Corporation, Rockford, Ill.
Filed Dec. 1, 1976, Ser. No. 746,521
Term of patent 14 years
Int. Cl. D8—06
U.S. Cl. D8—317



246,425
PULL
Leland George Stone, Largo, Fla., assignor to Amerock Corporation, Rockford, Ill.
Filed Dec. 8, 1976, Ser. No. 748,569
Term of patent 14 years
Int. Cl. D8—06
U.S. Cl. D8—318

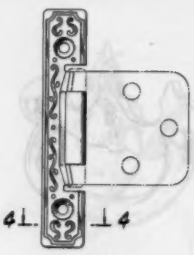
246,426
PULL FOR DOORS, DRAWERS OR THE LIKE
Keith E. Ridgway, West Covina, and Edward W. Scott, Culver City, both of Calif., assignors to Ajax Hardware Corporation, City of Industry, Calif.
Filed Jan. 13, 1977, Ser. No. 759,100
Term of patent 14 years
Int. Cl. D8—06
U.S. Cl. D8—318

246,427
PULL
Keith E. Ridgway, West Covina, and Edward W. Scott, Culver City, both of Calif., assignors to Ajax Hardware Corporation, City of Industry, Calif.
Filed Jan. 13, 1977, Ser. No. 759,079
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—318

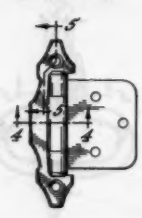
246,428
PULL
Jacqueline Brezney, Bridgewater, N.J., assignor to Unican Security Systems, Ltd., Montreal, Canada
Filed Feb. 16, 1977, Ser. No. 769,232
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—318

246,429
PENDANT PULL FOR DOORS, DRAWERS OR THE LIKE
David F. James, Redondo Beach, Calif., assignor to Norris Industries, Inc., Los Angeles, Calif.
Filed Mar. 29, 1976, Ser. No. 671,127
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—321

246,430
HINGE LEAF
David F. James, Redondo Beach, Calif., assignor to Norris Industries, Inc., Los Angeles, Calif.
Filed Mar. 29, 1976, Ser. No. 671,128
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—327



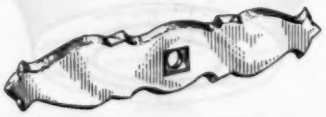
246,431
HINGE BASE
LaVerne E. Clayton, Rockford, Ill., assignor to Amerock Corporation, Rockford, Ill.
Filed Dec. 1, 1976, Ser. No. 746,607
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—327



246,432
KEYHOLE ESCUTCHEON
Raymond U. H. Tegner, Lodi, Wis., assignor to Amerock Corporation, Rockford, Ill.
Filed Dec. 1, 1976, Ser. No. 746,468
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—350

246,433
KEYHOLE ESCUTCHEON
Raymond U. H. Tegner, Lodi, Wis., assignor to Amerock Corporation, Rockford, Ill.
Filed Dec. 1, 1976, Ser. No. 746,529
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—350

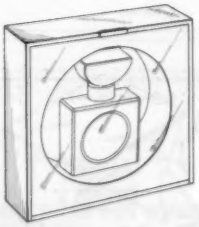
246,434
PULL BACKPLATE
Keith E. Ridgway, West Covina, and Edward W. Scott, Culver City, both of Calif., assignors to Ajax Hardware Corporation, City of Industry, Calif.
Filed Jan. 13, 1977, Ser. No. 759,049
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—350



246,435
ESCUTCHEON
Leland George Stone, Largo, Fla., assignor to Amerock Corporation, Rockford, Ill.
Filed Jan. 24, 1977, Ser. No. 761,891
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—350

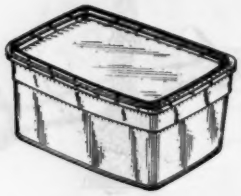
246,436
BACK PLATE
Jacqueline Brezney, Bridgewater, N.J., assignor to Unican Security Systems, Ltd., Montreal, Canada
Filed Feb. 16, 1977, Ser. No. 769,231
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—350

246,437
COMBINED BOTTLE AND DISPLAY CONTAINER
Adam J. Grodin, Forest Hills, N.Y., assignor to American Cyanamid Company, Stamford, Conn.
Filed Mar. 1, 1976, Ser. No. 662,298
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—12

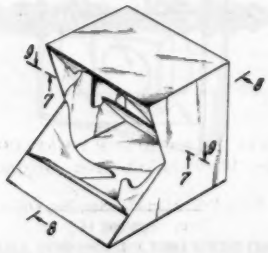


246,438
PACKAGING CONTAINER OR SIMILAR ARTICLE
Andrew E. Weber, 606 S. Olive St., Los Angeles, Calif. 90014
Filed Feb. 23, 1976, Ser. No. 660,166
Term of patent 14 years
Int. Cl. D9—*99*
U.S. Cl. D9—198

246,439
PACKAGING CONTAINER OR THE LIKE
Elmer C. Lynn, 405 Kimberly Lane, Des Moines, Iowa 50317, and Leonard Slaughter, Jr., 1828 Walnut Ave., Kansas City, Mo. 64108
Filed Nov. 26, 1975, Ser. No. 635,664
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—219

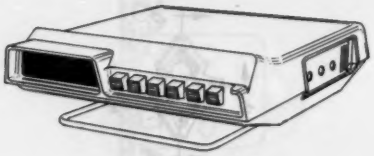


246,440
DISPLAY CARTON
Wallace E. Hanson, Hampden, Mass., assignor to Champion International Corporation, Stamford, Conn.
Filed Nov. 10, 1975, Ser. No. 630,295
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—224

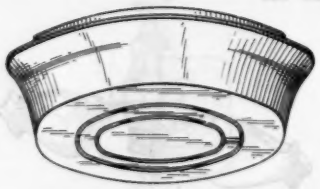


246,441
STRAIGHTEDGE
Fred Bergendorff, 7429 Orien, La Mesa, Calif. 92041
Filed Oct. 14, 1975, Ser. No. 622,066
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—71

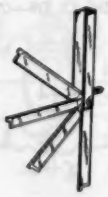
246,442
PORTABLE ELECTRONIC MULTIMETER
Donald P. Aupperle, Loveland, Colo., assignor to Hewlett-Packard Company, Palo Alto, Calif.
Filed Apr. 29, 1976, Ser. No. 681,315
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—78



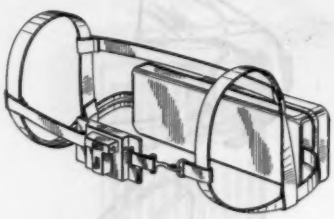
246,443
COMBINED FIRE AND SMOKE ALARM
Robert Orman Ernest, Oak Park, Ill., assignor to Sunbeam Corporation, Chicago, Ill.
Filed July 14, 1976, Ser. No. 705,123
Term of patent 14 years
Int. Cl. D10—*05*
U.S. Cl. D10—106



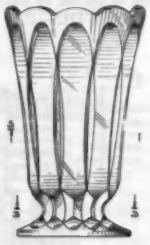
246,444
SAFETY REFLECTOR OR SIMILAR ARTICLE
John V. Kitrell, 1830 N. 49th, Lincoln, Nebr. 68504
Filed June 1, 1976, Ser. No. 691,821
Term of patent 14 years
Int. Cl. D10—*06*
U.S. Cl. D10—111



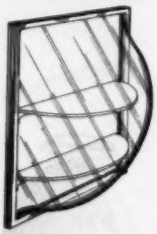
246,445
BACK PACK SIGNAL LIGHT UNIT
Bruce Wayne Inman, 469 Vernon Way, El Cajon, Calif. 92020
Filed Apr. 5, 1976, Ser. No. 673,620
Term of patent 7 years
Int. Cl. D10—*06;* D03—*99*
U.S. Cl. D10—114



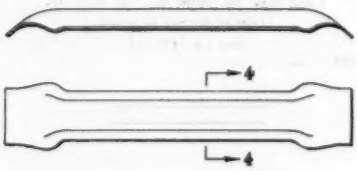
246,446
VASE OR SIMILAR ARTICLE
Frank J. Benes, Lancaster, Ohio, assignor to Anchor Hocking Corporation, Lancaster, Ohio
Division of Ser. No. 544,913, Jan. 29, 1975, Pat. No. Des. 243,431, which is a division of Ser. No. 397,069, Sept. 13, 1973, Pat. No. Des. 238,541. This application June 22, 1976, Ser. No. 698,761
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—153



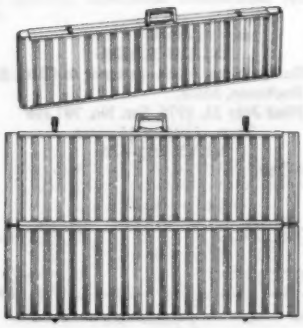
246,447
WINDOW GREENHOUSE
William H. Hamilton, 560 Concord Ave., Lexington, Mass. 02173
Filed Nov. 7, 1975, Ser. No. 629,791
Term of patent 14 years
Int. Cl. D25—*02;* D30—*02*
U.S. Cl. D11—145



246,448
RAILROAD TIE
Albert Edward Rex, Adelaide, Australia, assignor to General & Railway Supplies Pty. Ltd.
Filed Aug. 19, 1976, Ser. No. 716,000
Term of patent 14 years
Int. Cl. D12—*03*
U.S. Cl. D12—49

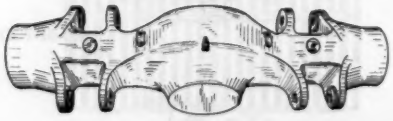


246,449
PORTABLE RAMP FOR WHEELCHAIRS
Alice M. Poe, 10330 Outlook Drive, Overland Park, Kans. 66207
Filed Feb. 23, 1976, Ser. No. 660,419
Term of patent 14 years
Int. Cl. D12—*05*
U.S. Cl. D12—53



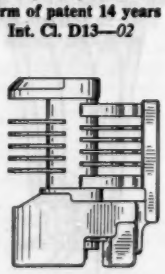
246,450
VEHICLE TIRE
Kazuo Matsuda, No. 2800-1, Ogawa-Higashi, Kodaira, Tokyo, and Hiroshi Kojima, No. 19-5, 4-Chome, Higashi-Toyota, Hino, Tokyo, both of Japan
Filed Feb. 3, 1977, Ser. No. 765,127
Claims priority, application Japan, Sept. 22, 1976, 51-37325
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—141

246,451
AXLE HOUSING
Noah Alvin Shealy, Niles, Mich., assignor to Clark Equipment Company, Buchanan, Mich.
Filed July 22, 1976, Ser. No. 707,595
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—160

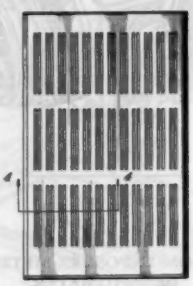


246,452
BICYCLE FAIRING
Moye Harris, 899 S. Umatilla Way, Denver, Colo. 80223
Filed Aug. 18, 1976, Ser. No. 715,311
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—182

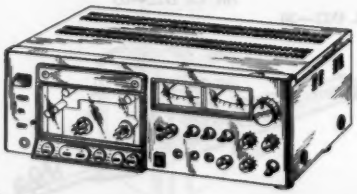
246,453
VARIABLE CAPACITOR
William J. Chermak; F. Joseph Kozan, and Chander M. Wahi, all of Waseca, Minn., assignors to E. F. Johnson Company, Waseca, Minn.
Filed Mar. 15, 1977, Ser. No. 778,781
Term of patent 14 years
Int. Cl. D13—*02*
U.S. Cl. D13—21



246,454
PRINTED CIRCUIT CABINET
John S. Ebner, Boca Raton; Sheldon Steinman, Miramar, and Frederick W. Haase, Palm Springs North, all of Fla., assignors to Milgo Electronic Corporation, Miami, Fla.
Filed Sept. 15, 1976, Ser. No. 723,555
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—41



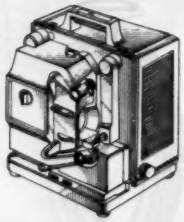
246,455
TAPE RECORDER
Shigeo Takahashi, Urawa, and Kaoru Sumita, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan
Filed June 16, 1976, Ser. No. 696,490
Claims priority, application Japan, Jan. 30, 1976, 51-2582
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—6



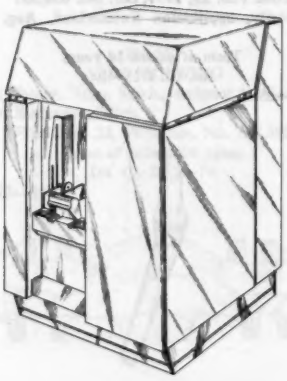
246,456
REMOTE OPERATED DRAIN FOR AN OIL PAN
Hiroyasu Mitsui, No. 24-9, Amanuma 1-chome, Suginami, Tokyo, Japan
Filed Jan. 15, 1976, Ser. No. 649,415
Term of patent 14 years
Int. Cl. D15—*01*
U.S. Cl. D15—5

246,457
CULTIVATOR TINE
Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland
Filed Feb. 19, 1976, Ser. No. 659,537
Claims priority, application Switzerland, Aug. 20, 1975, 50496/75
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D15—29

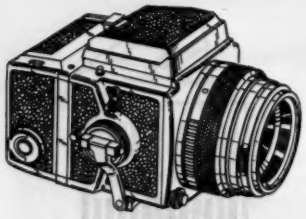
246,458
MOTION PICTURE PROJECTOR
Anastasios J. Vasilatos, 244 Hibbard Road, Wilmette, Ill. 60091, and Vincent S. Pasturczak, 4915 W. Argyle, Chicago, Ill. 60630
Filed Dec. 17, 1975, Ser. No. 641,398
Term of patent 14 years
Int. Cl. D16—*02*
U.S. Cl. D16—23



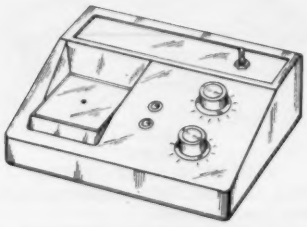
246,459
COPY FINISHER
Richard Joseph Olson, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.
Filed Mar. 30, 1976, Ser. No. 671,869
Term of patent 14 years
Int. Cl. D18—*99*
U.S. Cl. D16—32



246,460
SINGLE LENS REFLEX CAMERA
Zenzaburo Yoshino, 3-30-10, Kamikitazawa, Setagaya-ku, Tokyo, Japan
Filed Sept. 8, 1976, Ser. No. 721,303
Claims priority, application Japan, Mar. 9, 1976, 51-8029
Term of patent 14 years
Int. Cl. D16—*01*
U.S. Cl. D16—08



246,461
DARKROOM EXPOSURE METER AND DENSITOMETER
Darwin E. Chapman, 3481 Kenneth Drive, Palo Alto, Calif. 94306
Filed Feb. 6, 1976, Ser. No. 655,825
Term of patent 14 years
Int. Cl. D16—*05*
U.S. Cl. D16—39

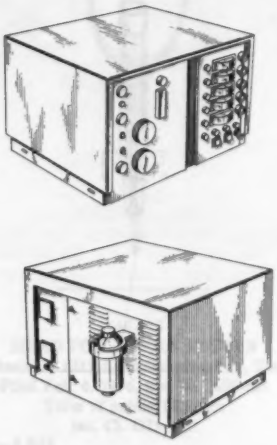


246,462
COMBINED ROD AND REEL
James R. Reichow, Brooklyn Park, Minn., assignor to St. Croix Corporation, Minneapolis, Minn.
Filed Nov. 22, 1976, Ser. No. 743,696
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—26

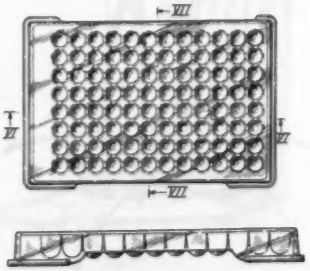
246,463
COMBINED SINK AND FAUCET
Donald W. Doman, Janesville, Wis., assignor to Kohler Co.
Filed Mar. 31, 1975, Ser. No. 563,567
The portion of the term of this patent subsequent to Feb. 1, 1991, has been disclaimed.
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—49

246,464
CHIMNEY CAP
David O. Brazell, La Mesa, Calif., assignor to Fireplace Sales, Division of Taylor Construction, San Marcos, Calif.
Filed May 3, 1976, Ser. No. 682,711
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—154

246,465
PROPORTIONAL DIALYSIS UNIT
James G. Bruni, Manhattan Beach, Calif.; Richard W. George, Libertyville, Ill.; Stephen G. Hauser, Tarzana, Calif.; Charles E. Hodgson, and Richard J. Range, both of Silver Spring, Md., assignors to Baxter Travenol Laboratories, Inc.
Filed May 24, 1976, Ser. No. 689,004
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D24—21

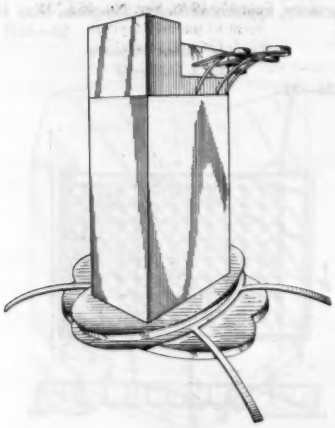


246,466
TRAY FOR BIOLOGICAL TESTS
James Albert Attree, Gravesend, and Kenneth George Morallee, Orpington, both of England, assignors to Lever Brothers Company, New York, N.Y.
Filed Nov. 15, 1976, Ser. No. 741,770
Claims priority, application United Kingdom, May 14, 1976, 975663/76
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—31



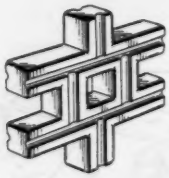
246,467
TEST TUBE
Motoji Kurata, Hatsukaichi, Japan, assignor to Japan Medical Supply Co., Ltd., Japan
Filed Nov. 5, 1975, Ser. No. 629,042
Term of patent 7 years
Int. Cl. D24—*02*
U.S. Cl. D24—56

246,468
BUILDING
Joseph N. DiPasqua, 611 Ora St., Daytona Beach, Fla. 32018
Filed Sept. 25, 1974, Ser. No. 509,296
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—5



246,469
BUILDING
James D. Morton, and Luke Arnett, both of P.O. Box 26332, Houston, Tex. 77207
Filed Aug. 18, 1975, Ser. No. 605,548
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—7

246,470
BUILDING BLOCK
Mitsuru Sato, No. 3690, Tsuruta-Cho, Utdunomiya, Tochigi, Japan
Filed Dec. 29, 1975, Ser. No. 645,298
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—91



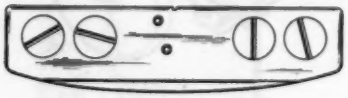
246,471
LIGHTER
Franz Alban Stützer, Mulheim (Main), and Bernd Figur, Nieder-Roden, both of Germany, assignors to Rowenta-Werke GmbH, Offenbach (Main), Germany
Filed Sept. 27, 1976, Ser. No. 727,316
Claims priority, application Germany, Apr. 2, 1976, 59941
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—42

246,472
LIGHTER
Franz Alban Stützer, Mulheim (Main), Germany, assignor to Rowenta-Werke GmbH, Offenbach (Main), Germany
Filed Oct. 18, 1976, Ser. No. 733,031
Claims priority, application Germany, Apr. 23, 1976, 59946
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—42

246,473
LIGHTER
Franz Alban Stützer, Mulheim (Main), Germany, assignor to Rowenta-Werke GmbH, Offenbach (Main), Germany
Filed Nov. 11, 1976, Ser. No. 740,846
Claims priority, application Germany, Aug. 6, 1976, 59964
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—42

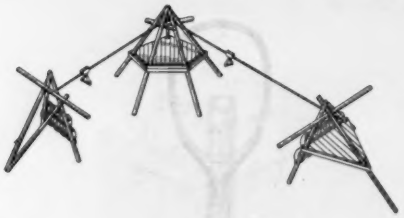
246,474
RACKETBALL RACKET FRAME
Charles L. Segal; Michael G. Anderson, and David N. Vincent, all of San Diego, Calif., assignors to Groves-Kelco Sales, Inc., Bloomington, Minn.
Filed Oct. 31, 1975, Ser. No. 627,789
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 ST

246,475
HEAD FOR A GOLF PUTTER
O. Jackson Denman, 1212 Lynn, Weatherford, Tex. 76086
Filed Feb. 4, 1976, Ser. No. 655,151
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GH

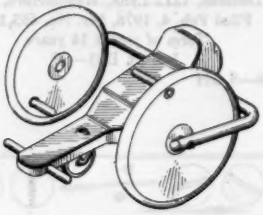


246,476
BASEBALL GAME BANGBOARD
Donald McGuire, 91 Parker St., Lowell, Mass. 01851
Filed Feb. 17, 1976, Ser. No. 658,281
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 PP

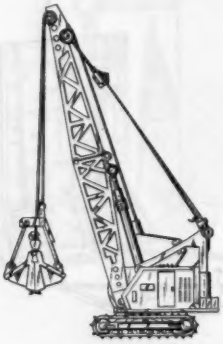
246,477
CHILD RECREATION STRUCTURE
Robert L. Callecod, Long Lake, Minn., assignor to Recreation Systems Co., North Aurora, Ill.
Filed June 4, 1976, Ser. No. 693,225
Term of patent 14 years
Int. Cl. D21—*03*
U.S. Cl. D34—5 L



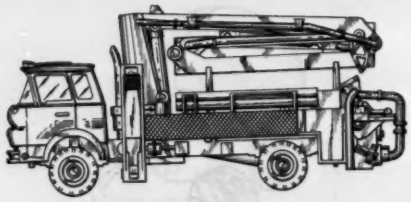
246,478
TOY VEHICLE
Raymond J. Lohr, 5043 Sterrettania Road, Erie, Pa. 16506
Filed Oct. 31, 1975, Ser. No. 627,547
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ



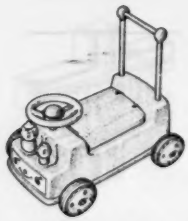
246,479
TOY VEHICLE
Kiyoji Asano, 2-27-23, Sumida, Sumida, Tokyo, Japan
Filed Dec. 2, 1975, Ser. No. 637,003
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ



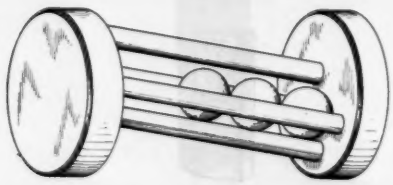
246,480
TOY VEHICLE
Kiyoji Asano, 2-27-23, Sumida, Sumida, Tokyo, Japan
Filed Dec. 2, 1975, Ser. No. 637,094
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ



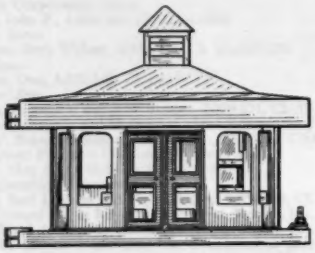
246,481
TOY VEHICLE
Shinroku Nakao, Yokohama, Japan, assignor to Combi Co., Ltd., Tokyo, Japan
Filed Jan. 2, 1976, Ser. No. 646,103
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ



246,482
AUDIBLE TOY
Kerstin Margaretha Hagland-Ahrnborg, Falun, Sweden, assignor to Brio Toy AB, Osby, Sweden
Filed Jan. 5, 1976, Ser. No. 646,673
Claims priority, application Germany, July 8, 1975, 447
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 C

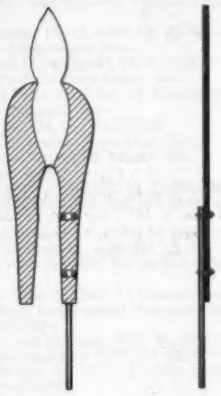


246,483
TOY RESTAURANT
Michael I. Sattea, 15 Spruce Place, Great Neck Estates, N.Y. 11021
Filed Jan. 29, 1976, Ser. No. 653,545
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 LL



246,484
MODULAR TRAVEL CASE
Arnold S. Wasserman, 826 Cheltenham Road, Santa Barbara, Calif. 93105
Filed Dec. 30, 1975, Ser. No. 645,366
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—5 G

246,485
ANIMAL WARNING SIGN
Terry L. Bashore, 259 Governors Park Road, Bellefonte, Pa. 16823
Filed May 27, 1976, Ser. No. 690,594
Term of patent 14 years
Int. Cl. D20—*03*
U.S. Cl. D96—12 C



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 22ND DAY OF NOVEMBER, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

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A. O. Smith Corporation: *See*—
Eising, John P., 4,059,386, Cl. 431-43.000.

AB Bofors: *See*—
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AB IRO: *See*—
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Acda, Petrus Marinus; and Guitoneau, Hans Edward, to Polva Nederland B. V. Branch connection. 4,059,291, Cl. 285-197.000.

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Acorn Engineering Company: *See*—
Morris, Earl Lavern; and Fields, Larry, 4,059,289, Cl. 285-56.000.

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Adams, John M., to Medtronic, Inc. Synchronous pacemaker with upper rate stabilization and method of use. 4,059,116, Cl. 128-419.0PG.

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Maul, John A.; and Valentine, Richard E., 4,059,051, Cl. 101-45.000.

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Perold, Helmuth Conny, 4,059,255, Cl. 269-323.000.

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Agnus, Pierre; and Butin, Henri, to Thomson-CSF. Frequency comparison circuit. 4,059,804, Cl. 328-134.000.

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Ahlen, Karl Gustav, to S.R.M. Hydromekanik Aktiebolag. Heat exchangers. 4,058,980, Cl. 60-337.000.

Ahmed, Adel Abdel Aziz, to RCA Corporation. Semiconductor circuits for generating reference potentials with predictable temperature coefficients. 4,059,793, Cl. 323-19.000.

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Alberny, Robert; Birat, Jean Pierre; and Ventavoli, Roger, to Institut de Recherches de la Siderurgie Francaise (IRSID). Continuous casting of a metallic product by electromagnetic centrifuging. 4,059,142, Cl. 164-49.000.

Alexandrov, Anatoly Julianovich; Grushko, July Sergeevich; Makarov, Evgeny Fredovich; Mishin, Konstantin Yakovlevich; and Baltrunas, Daljus Antanas Jono. Starting material radiation source for Mossbauer investigations of tellurium compounds. 4,059,769, Cl. 250-493.000.

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Altenburger, Otto, to Stromberg-Carlson Corporation. Call distributor for increasing switching system call termination rate. 4,059,733, Cl. 179-18.0ET.

Alvarez, Joseph A.; and Mills, Robert J., to Reed Tool Company. Bearing retaining pin for earth boring drill. 4,059,316, Cl. 308-8.200.

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AMP Incorporated: *See*—
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Amstutz, Jacob. Track assembly for tracked vehicles. 4,059,314, Cl. 305-31.000.

Anders, Walter G.; Cole, Michael A.; Duncan, James C.; and Leipelt, Paul A., to Diebold, Incorporated. Pneumatic tube banking system. 4,059,246, Cl. 243-7.000.

Andersen, Poul H.; and Erickson, John W., to Kobe, Inc. Pitot compressor with liquid separator. 4,059,364, Cl. 415-89.000.

Anderson, John Erling, to Union Carbide Corporation. Slag tap. 4,059,252, Cl. 266-236.000.

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Anthony, Andrew J., to Combustion Engineering, Inc. Nuclear fuel assembly seismic amplitude limiter. 4,059,483, Cl. 176-78.000.

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Aragona, Louis. Shirt type garment including built in arm positioning means. 4,058,852, Cl. 2-115.000.

Arai, Fumio; Kira, Masaaki; Kokuryo, Shiro; and Ueshima, Takashi, to Showa Denko Kabushiki Kaisha. Flame-resistant composition containing a norbornene derivative polymer. 4,059,561, Cl. 260-45.80R.

Arai, Kazuo, to Iwata Air Compressor Mfg. Co., Ltd. Pressure coating roller assembly. 4,059,358, Cl. 401-219.000.

Archer, John L.: *See*—
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Ariyama, Kenzo; Mano, Hiroshi; and Kamiyama, Shinichi, to Ricoh Co., Ltd. Heat fixing apparatus for use in a wet electrophotographic copying machine. 4,059,394, Cl. 432-59.000.

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Asami, Kazuto, to Glory Kogyo Kabushiki Kaisha. Coin packaging machine. 4,058,954, Cl. 53-54.000.

Aschberger, Anton A.; Avery, Jack L.; Cartwright, William J.; Dean, Geoffrey J.; Tysver, Oliver J.; Wolfe, Robert W.; and Bautz, Frederick H., to Continental Group, Inc., The. Can body shaper. 4,059,186, Cl. 198-481.000.

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Axcell, Barry Clifford; and Donninger, Cyril, to Chembro Holdings (Proprietary) Limited. Measurement of alkaline phosphatase levels in body fluids. 4,059,490, Cl. 195-99.000.

Axen, Udo F., to Upjohn Company, The. 2,2-Difluoro-16-phenoxy-PGE$_1$ analogs. 4,059,614, Cl. 560-53.000.

Aya, Masahiro; Saito, Junichi; Kume, Toyohiko; and Yasui, Kazuomi, to Bayer Aktiengesellschaft. Organic (thio) phosphoric acid ester compounds and herbicidal compositions. 4,059,430, Cl. 71-86.000.

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Bahr, Albert. Pretreatment filter press dewatering system. 4,059,527, Cl. 210-259.000.

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Becton, Dickinson and Company: *See—*
Hochstrasser, Harry T., 4,059,407, Cl. 23-253.0TP.

Beecham Group Limited: *See—*
Buckle, Derek Richard; Cantello, Barrie Christian Charles; and Smith, Harry, 4,059,704, Cl. 424-269.000.

Beels, Roland Francois: *See—*
Hazenbosch, Edwin Hendrik; Van Rossen, Antoine Roberta; Beels, Roland Francois; and Aelterman, Marcel Frans, 4,059,446, Cl. 96-50.00R.

Behr, Friedrich: *See—*
Schulten, Rudolf; and Behr, Friedrich, 4,059,496, Cl. 204-104.000.

Behrenz, Wolfgang: *See—*
Maurer, Fritz; Riebel, Hans-Jochem; Hammann, Ingeborg; Behrenz, Wolfgang; and Homeyer, Bernhard, 4,059,696, Cl. 424-200.000.

Beilfuss, Wolfgang: *See—*
Eggensperger, Heinz; Beilfuss, Wolfgang; and Ehlers, Helmut Hermann, 4,059,596, Cl. 260-347.800.

Beinsen, Dieter; and Kribitzneck, Otto. Aspirators for medical purposes. 4,059,113, Cl. 128-276.000.

Belasco, Melvin; and Cottongim, Billie Joe, to Texas Instruments Incorporated. Multi-element infra red sensors. 4,059,764, Cl. 250-352.000.

Bell, Peter W.: *See—*
Edgar, John B.; and Bell, Peter W., 4,059,465, Cl. 156-72.000.

Bell Telephone Laboratories, Incorporated: *See—*
Green, John Henry; and Landry, Joseph Elide, 4,059,731, Cl. 179-15.0BY.
Heiss, John Herbert, Jr.; and Schoen, Joel Mark, 4,059,708, Cl. 427-96.000.
Kahn, Frederic Jay; and Taylor, Gary Newton, 4,059,340, Cl. 350-160.0LC.
Mancke, Ralph Gustavus; and Soos, Nicholas Alec, 4,059,467, Cl. 156-80.000.
Messerschmitt, David Gavin; and Zebo, Timothy James, 4,059,730, Cl. 179-15.0AS.

Bellem, Norman A., to Butler Manufacturing Company. Building roof insulation. 4,058,949, Cl. 52-407.000.

Bellina, Russell Frank, to Du Pont de Nemours, E. I., and Company. Butyramides and butyrates. 4,059,623, Cl. 260-561.00A.

Bendix Corporation, The: *See—*
Snyder, Gene L.; and Hennessey, Walter F., Jr., 4,059,324, Cl. 339-89.00M.

Bennett, Everett W., to Union Carbide Corporation. Non-isomerizable olefinic polyoxyalkylene polymers and siloxane-polyoxyalkylene copolymer derivatives thereof. 4,059,605, Cl. 260-448.20B.

Benson, Gustav E., to Owens-Corning Fiberglas Corporation. Bulked yarn and method of forming a bulked yarn. 4,058,968, Cl. 57-140.00R.

Bentley, John; and Thompson, Morice William, to Imperial Chemical Industries Limited. Polymer dispersions. 4,059,557, Cl. 260-31.20N.

Bentz, Francis: *See—*
Neukam, Theo; Reinehr, Ulrich; Bentz, Francis; and Nischk, Gunther, 4,059,556, Cl. 260-30.200.
Wolf, Gerhard Dieter; Miessen, Ralf; Kunzel, Hans Egon; and Bentz, Francis, 4,059,403, Cl. 8-168.00B.

Bentz, Gerard, to L'air Liquide, Societe Anonyme pour l'etude et l'exploitation des Procedes Georges Claude. Apparatus for the controlled supply of cryogenic fluid. 4,059,424, Cl. 62-49.000.

Berg, Clyde H. Geothermal brine production. 4,059,156, Cl. 166-314.000.

Berger, Alfred: *See—*
De Vos, Daniel; Michel, Paul-Marie; and Berger, Alfred, 4,059,423, Cl. 65-21.000.

Berger, Richard M., to American Filtrona Corporation. Method and apparatus for making tobacco smoke filters. 4,059,043, Cl. 93-1.00C.

Berges, David A., to SmithKline Corporation. Ureidoalkyl substituted tetrazole thiol intermediates for preparing cephalosporins. 4,059,591, Cl. 260-308.00D.

Bergman, Raymond A. Method for locating and clamping a work member supporting fixture. 4,058,885, Cl. 29-559.000.

Bernard, Walter J., to Sprague Electric Company. Method for making a porous tantalum pellet. 4,059,442, Cl. 75-208.00R.

Bernett, Frank E.: *See—*
Weiant, Davis S.; Bernett, Frank E.; and Velivis, William R., 4,059,551, Cl. 260-29.60H.

Berryman, Angus L.; Hooper, Gene R.; and Hague, Richard E., to Rax, Incorporated. Railway side parcel installation. 4,059,056, Cl. 105-368.00R.

Berryman, William O., to Baker International Corporation. Hydraulic fishing jar having tandem piston arrangement. 4,059,167, Cl. 175-297.000.

Bertin & Cie: *See—*
Cellier, Michel Jean Jacques; Guitton, Jean-Claude; Scholle, Jean-Claude; and Viannay, Stephane Georges Jean-Marie, 4,059,399, Cl. 432-121.000.

Bethlehem Steel Corporation: *See—*
Mino, George M.; and Dustin, Donald L., 4,059,711, Cl. 427-310.000.

Betts, William L., to NCR Corporation. Digital conference system. 4,059,735, Cl. 179-18.0BC.

Betz Laboratories, Inc.: *See—*
Fowler, William J.; Heberle, Richard A.; Tonkyn, Richard G.; and Vorchheimer, Norman, 4,059,515, Cl. 210-51.000.

Beyers, Marvin E.; and Dadds, Floyd S., to Caterpillar Tractor Co. Track belt assembly. 4,059,313, Cl. 305-19.000.

Bicking, John B.: *See—*
Cragoe, Edward J., Jr.; and Bicking, John B., 4,059,601, Cl. 260-408.000.
Cragoe, Edward J., Jr.; and Bicking, John B., 4,059,602, Cl. 260-408.000.

Biedert, Hartmut: *See—*
Spitzer, Artur; Biedert, Hartmut; and Gramlich, Fritz, deceased, 4,059,311, Cl. 302-53.000.

Bifok AB: *See—*
Ibsen Nielsen, Hans Jorgen; and Hansen, Elo Harald, 4,059,499, Cl. 204-195.00M.

Binsack, Rudolf: *See—*
Elfert, Klaus; Hinz, Jurgen; and Binsack, Rudolf, 4,059,580, Cl. 544-73.000.

Bio Research Center, Co., Ltd.: *See—*
Hachikubo, Kazumasa; and Suzuki, Shuzo, 4,059,488, Cl. 195-28.00R.

Birat, Jean Pierre: *See—*
Alberny, Robert; Birat, Jean Pierre; and Ventavoli, Roger, 4,059,142, Cl. 164-49.000.

Birkenstock, Udo: *See—*
Kritzler, Helmuth; Bohm, Walter; Kiel, Wolfgang; and Birkenstock, Udo, 4,059,627, Cl. 260-580.000.

Bitners, Feliks: *See—*
Hausweiler, Arnold; Mayer, Adolf; and Bitners, Feliks, 4,059,492, Cl. 203-11.000.

Bittle, David F.; and McPeters, Arnold L., to Monsanto Company. Method of stretching a tow. 4,059,668, Cl. 264-290.00R.

Bixler, Kenneth D.: *See—*
Reifers, Richard F.; Bixler, Kenneth D.; and Lord, Henry A., 4,059,219, Cl. 229-2.5EC.

Blaha, Eli W.; Koster, Sandra K.; and Wang, Chen-Shen, to Standard Oil Company (Indiana). Process for forming branched nitropolyphenylene. 4,059,719, Cl. 526-52.000.

Blomsma, Everhard C., to Shell Oil Company. Pressure-compensated dual marine riser. 4,059,148, Cl. 166-.500.

Blu-Ray, Incorporated: *See—*
Barto, Robert M.; and Shelffo, Loren E., 4,059,409, Cl. 23-284.000.

Blumenfeld, Georg; Richtzenhain, Hermann; Vogt, Wilhelm; and Volkommer, Norbert, to Dynamit Nobel Aktiengesellschaft. Tetrahalogen xylylene diacrylates, tetrahalogen xylyl acrylates, pentahalogen benzyl acrylates, and substituted acrylates. 4,059,618, Cl. 560-221.000.

Bockelmann, Wilfried; Veigel, Martin W.; Grossmann, Dietrich; Grozinger, Hans; and Schwander, Dieter. Regulating device for metering a supplementary air quantity to improve combustion in combustion engines. 4,058,978, Cl. 60-277.000.

Bodnar, Ernest Robert. Rotary embosser and process of embossing strip sheet metal. 4,059,000, Cl. 72-197.000.

Bohm, Leslie Eric: *See—*
Jackson, W. Shaun; and Bohm, Leslie Eric, 4,059,207, Cl. 224-31.000.

Bohm, Walter: *See—*
Kritzler, Helmuth; Bohm, Walter; Kiel, Wolfgang; and Birkenstock, Udo, 4,059,627, Cl. 260-580.000.

Bohn, Jack R.: *See*—
Pearson, Durk J.; and Bohn, Jack R., 4,059,308, Cl. 299-5.000.

Boisde, Gilbert; and Richerot, Alain, to Commissariat a l'Energie Atomique. Automatic liquid-liquid extraction device. 4,059,408, Cl. 23-267.00R.

Bolt Beranek and Newman, Inc.: *See*—
Watters, Bill G.; Nacey, Michael; and Horrall, Thomas R., 4,059,726, Cl. 179-1.50M.

Bom, Cornelis Johannes Gerardus: *See*—
van der Lely, Ary; and Bom, Cornelis Johannes Gerardus, 4,059,160, Cl. 172-47.000.

Bombardier Limited: *See*—
Esquilat, Georges, 4,058,913, Cl. 37-50.000.

Bonazza, Benedict R.: *See*—
Holtz, Hans D.; and Bonazza, Benedict R., 4,059,414, Cl. 44-58.000.

Bond, Joseph Kim: *See*—
Korff, Wolfram G.; Emery, Vernon V.; Bond, Joseph Kim; and Marcella, Joseph, 4,059,379, Cl. 425-393.000.

Bond, Thomas J.: *See*—
Judzis, Arnis; and Bond, Thomas J., 4,059,380, Cl. 425-298.000.

Bonecutter, Thayer A.; Lewis, Charles E.; and Smith, John E., to McGraw-Edison Company. Electrical loadbreak fuse and canister assembly. 4,059,816, Cl. 337-278.000.

Bonham, Arthur R.: *See*—
Eddy, Wesley L.; Mullen, Daniel J.; and Bonham, Arthur R., 4,059,729, Cl. 179-15.0BF.

Borg-Warner Corporation: *See*—
Ivey, John Saxon; and Braybrook, Kenneth Albert, 4,059,365, Cl. 416-174.000.

Bothwell, Bruce E. Metal-ceramic composite and method for making same. 4,059,712, Cl. 428-36.000.

Botterill, Derrick: *See*—
Samson, Ronald; and Botterill, Derrick, 4,059,274, Cl. 273-130.00D.

Bouillon, Bernard, to Commissariat a l'Energie Atomique. Method of manufacture of parts of three-dimensional fabrics. 4,059,468, Cl. 156-93.000.

Bourboulis, Cedric D. Heat deflector. 4,059,092, Cl. 126-215.000.

Boxer, Robert Keith: *See*—
Boxer, Rubin; and Boxer, Robert Keith, 4,058,853, Cl. 2-239.000.

Boxer, Rubin; and Boxer, Robert Keith. Socks with flexible self-contained fastener patches. 4,058,853, Cl. 2-239.000.

Boyajian, Alfred Z. Bolt cutter. 4,058,893, Cl. 30-250.000.

BP Chemicals Limited: *See*—
Cane, Charles; and Yeomans, Bertram, 4,059,632, Cl. 260-586.00C.

Brabson, Grafton K., to Armstrong Cork Company. Luminaire lens insert. 4,059,755, Cl. 362-224.000.

Brackmann, Warren A.; and Di Ianni, Daniel, to Rothmans of Pall Mall Canada Limited. Filter for tobacco smoke. 4,059,121, Cl. 131-269.000.

Braden, William B., Jr.; and Flourny, Kenoth H., to Texaco Inc. Micellar dispersions with tolerance for extreme water hardness for use in petroleum recovery. 4,059,154, Cl. 166-274.000.

Brandenstein, Manfred: *See*—
Ernst, Horst Manfred; Olschewski, Armin; Schurger, Rainer; Walter, Lothar; Brandenstein, Manfred; and Burkl, Erich, 4,059,179, Cl. 192-98.000.

Brandon, Bobby C.: *See*—
DePriest, Donald R.; Brandon, Bobby C.; and Buie, Connell M., 4,059,104, Cl. 128-132.00D.

Braybrook, Kenneth Albert: *See*—
Ivey, John Saxon; and Braybrook, Kenneth Albert, 4,059,365, Cl. 416-174.000.

Bredland, Alf Marlov; Fong, Walter Lee; Messing, Terry Glen; and Paulson, John Walter, to ESB Incorporated. Battery having mask which electrochemically inactivates limited surface of metallic component. 4,059,717, Cl. 429-162.000.

Brendel, Albert E.; and Sedman, Myron P., to Lebow Associates, Inc. Rotary transformer shunt calibration. 4,059,005, Cl. 73-1.00B.

Brewer, John C., to Garbalizer Corporation of America. Shearing structure in materials reduction machinery. 4,059,236, Cl. 241-243.000.

Bricot, Claude; and Lehureau, Jean-Claude, to Thomson-Brandt. Optical read-out system including asymetrical beam intensity and four detector cells. 4,059,841, Cl. 358-128.000.

Bridgestone Tire Company Limited: *See*—
Nishimoto, Kichinosuke; and Nishimura, Seiichiro, 4,059,139, Cl. 157-13.000.

Bridwell, John W.; and Meiner, George H., III, to Caterpillar Tractor Co. Hydraulic system for extremely cold environments. 4,059,042, Cl. 91-469.000.

Brinkmann, Bernd; and Griebach, Eugen, to Schering Aktiengesellschaft. Moisture-hardenable sealing and coating compounds. 4,059,549, Cl. 260-22.0TN.

British Petroleum Company Limited, The: *See*—
Cartwright, Colin William; and Lamb, Donald, 4,059,505, Cl. 208-310.00Z.

British Steel Corporation: *See*—
Furness, Bernard J.; Cousins, John R.; and Tuft, Dennis, 4,059,794, Cl. 324-208.000.
Timms, Ralph G., 4,059,472, Cl. 156-259.000.

Brizzolara, Ernest E., to Eastman Kodak Company. Web material storage device. 4,059,211, Cl. 226-11.000.

Brody, Mitchell D. Demand controller. 4,059,747, Cl. 364-493.000.

Brophy, James Mackay: *See*—
Morro, William Charles; Hakka, Leo Ernest; Brophy, James Mackay; Hebrard, Michel Jacques Roger; and Courtes, Jean Claude, 4,059,534, Cl. 252-32.70E.

Brown, Donald J., to Knox Manufacturing Co. Brake mechanism for motor driven projection screen. 4,059,339, Cl. 350-117.000.

Brown, Elwood B.: *See*—
Krivec, Bert; Brown, Elwood B.; and Raynor, Warren S., 4,059,180, Cl. 193-37.000.

Brown Oil Tools, Inc.: *See*—
Manderscheid, Phillip H., 4,059,150, Cl. 166-120.000.

Brown, Robert L. Machine and method for successively feeding stacked blanks. 4,059,261, Cl. 271-9.000.

Brown & Root, Inc.: *See*—
Weidler, Jay B., Jr.; and Stelly, Charles Warren, 4,058,984, Cl. 61-48.000.

Browning, John H. D.: *See*—
Watson, Hugh R.; Rowsell, David G.; and Browning, John H. D., 4,059,118, Cl. 131-8.00R.

Bruderlein, Francois T., to Ayerst McKenna and Harrison Ltd. Process for preparing an intermediate for CNS depressants. 4,059,585, Cl. 260-286.00Q.

Bryant Grinder Corporation: *See*—
Lovely, John W.; and Hobbs, Robert N., 4,058,934, Cl. 51-5.00D.

Bryant, James G., to Bryant-Poff, Inc. Shredding device. 4,059,235, Cl. 241-223.000.

Bryant-Poff, Inc.: *See*—
Bryant, James G., 4,059,235, Cl. 241-223.000.

Brydges, William T., III; and Illig, Edwin J., to Corning Glass Works. Gaseous process for hydrating and extruding glass. 4,059,425, Cl. 65-22.000.

Bryson, Roy E., to United States Steel Corporation. Ore tailings treatment. 4,059,506, Cl. 209-18.000.

Bucher, Robert: *See*—
Diesner, Ferdinand; and Bucher, Robert, 4,059,133, Cl. 139-440.000.

Bucher, Robert R., to Sulzer Brothers Limited. Jacquard selection system. 4,059,131, Cl. 139-59.000.

Buckle, Derek Richard; Cantello, Barrie Christian Charles; and Smith, Harry, to Beecham Group Limited. Tetrazole coumarin derivatives. 4,059,704, Cl. 424-269.000.

Buie, Connell M.: *See*—
DePriest, Donald R.; Brandon, Bobby C.; and Buie, Connell M., 4,059,104, Cl. 128-132.00D.

Bullis, Douglas E.: *See*—
Linde, John P.; and Bullis, Douglas E., 4,058,925, Cl. 42-79.000.

Bunina, Nina Sergeevna: *See*—
Perevodchikov, Vladimir Innokentievich; Shapenko, Valentina Nikolaevna; Chernov, Zarem Sergeevich; and Bunina, Nina Sergeevna, 4,059,784, Cl. 315-349.000.

Bunnelle, Philip R., to FMC Corporation. Subterranean drilling and slurry mining. 4,059,166, Cl. 175-232.000.

Bupp, Lamar P.; and Sofer, George A., to Exxon Nuclear Company, Inc. Hybrid nuclear fuel assembly with reduced linear heat generation rates. 4,059,484, Cl. 176-78.000.

Burkhalter, John E.: *See*—
Runge, Thomas M.; Burkhalter, John E.; and Pallas, Spiros George, 4,058,857, Cl. 3-1.700.

Burkhardt, Jurgen; Hittmair, Paul; and Wegehaupt, Karl-Heinrich, to Wacker-Chemie GmbH. Process for preparing N-triorganosilylcarbamide acid esters. 4,059,559, Cl. 260-448.20E.

Burkl, Erich: *See*—
Ernst, Horst Manfred; Olschewski, Armin; Schurger, Rainer; Walter, Lothar; Brandenstein, Manfred; and Burkl, Erich, 4,059,179, Cl. 192-98.000.

Burrell, Raymond Alexander; and Cox, John Michael, to Imperial Chemical Industries Limited. Pesticidal compounds, processes and compositions. 4,059,703, Cl. 424-269.000.

Butin, Henri: *See*—
Agnus, Pierre; and Butin, Henri, 4,059,804, Cl. 328-134.000.

Butler Manufacturing Company: *See*—
Bellem, Norman A., 4,058,949, Cl. 52-407.000.

Buttner, Gerhard: *See*—
Wolfrum, Gerhard; Kuhnel, Werner; Klauke, Erich; and Buttner, Gerhard, 4,059,402, Cl. 8-2.50A.

Buvel, Harry: *See*—
Miller, Bernard; Martin, J. Ronald; Meiser, Charles H., Jr.; Lambert, Harold W.; and Buvel, Harry, 4,059,007, Cl. 73-190.00R.

Byatt, Dennis William George, to Marconi Company Limited, The. Molecular information storage systems. 4,059,827, Cl. 365-126.000.

C. H. Heist Corporation: *See*—
Goodwin, Robert J., 4,058,870, Cl. 15-104.10R.

C. van der Lely N. V.: *See*—
van der Lely, Ary; and Bom, Cornelis Johannes Gerardus, 4,059,160, Cl. 172-47.000.

Cahen, Olivier, to Thomson-CSF. Switching inverter with thermoconductive materials. 4,059,774, Cl. 307-299.00R.

Calas, Raymond; Dunogues, Jacques; Deleris, Gerard; Lefort, Marcel; and Simonnet, Christian, to Rhone-Poulenc Industries. Process for the preparation of hydrogenosilanes. 4,059,608, Cl. 260-448.20E.

Calvin, Donald W.: *See*—
Leathers, Joel F. M.; and Calvin, Donald W., 4,059,680, Cl. 423-337.000.

Campau, Walter Joseph: *See*—
Tomczak, Lawrence William; Crall, Frederick William; Caron, LaVerne Andrew; and Campau, Walter Joseph, 4,058,888, Cl. 29-593.000.

Camusot, Gerard R. Tiered grandstand. 4,058,939, Cl. 52-2.000.

Canada, Atomic Energy of, Limited: *See*—
Heighway, Edward A.; Hohban, Kenneth J.; and Schriber, Stanley O., 4,059,763, Cl. 250-336.000.
Canadian General Electric Company Limited: *See*—
Whiteley, Eric, 4,059,777, Cl. 310-64.000.
Canadian Patents and Development Limited: *See*—
Kinsner, Witold; and Torre, Edward Della, 4,059,829, Cl. 365-19.000.
Narang, Saran A.; and Stawinski, Jacek, 4,059,592, Cl. 260-308.00D.
Struble, Dean L.; and Lilly, Charles E., 4,059,689, Cl. 424-84.000.
Cane, Charles; and Yeomans, Bertram, to BP Chemicals Limited. Process for the production of isophorone. 4,059,632, Cl. 260-586.00C.
Cannell, Lawrence G., to Shell Oil Company. High density fuels. 4,059,644, Cl. 260-666.0PY.
Canney, Robert S.: *See*—
Ouelette, Ronald J.; Canney, Robert S.; and Stetson, Ralph B., 4,059,326, Cl. 339-113.00R.
Canon Kabushiki Kaisha: *See*—
Kitamura, Takashi; Watanabe, Asao; Nakano, Takashi; Masaki, Katsumi; Hirayama, Kazuhiro; Sato, Yasushi; and Tokiwa, Taisuke, 4,059,833, Cl. 346-108.000.
Komine, Yoshio; and Hirata, Noritsugu, 4,059,349, Cl. 352-72.000.
Cantello, Barrie Christian Charles: *See*—
Buckle, Derek Richard; Cantello, Barrie Christian Charles; and Smith, Harry, 4,059,704, Cl. 424-269.000.
Carlson, Alden J., to Warwick Electronics Inc. Electrical musical instrument with chord generation. 4,059,039, Cl. 84-1.010.
Carmi, Arieh; Chang, Zung S.; and Rayeski, Thomas J., to Corning Glass Works. Glass pressing plunger cooling. 4,059,429, Cl. 65-355.000.
Carney, Leroy L.: *See*—
Watson, Jimmie L.; and Carney, Leroy L., 4,059,533, Cl. 252-8.50A.
Carnwath, Joseph W., to Pennsylvania Pacific Corporation. Pallet assembly. 4,059,057, Cl. 108-51.100.
Caron, LaVerne Andrew: *See*—
Tomczak, Lawrence William; Crall, Frederick William; Caron, LaVerne Andrew; and Campau, Walter Joseph, 4,058,888, Cl. 29-593.000.
Carpano & Pons: *See*—
Mazuir, Maurice, 4,059,780, Cl. 310-164.000.
Carre, Jean-Jacques, to Societe Anonyme D.B.A. Braking correction device. 4,059,174, Cl. 188-195.000.
Carten, Charles T.: *See*—
Van Huis, Robert L.; and Carten, Charles T., 4,059,071, Cl. 119-18.000.
Cartwright, Colin William; and Lamb, Donald, to British Petroleum Company Limited, The. Separating hydrocarbons. 4,059,505, Cl. 208-310.00Z.
Cartwright, William J.: *See*—
Aschberger, Anton A.; Avery, Jack L.; Cartwright, William J.; Dean, Geoffrey J.; Tysver, Oliver J.; Wolfe, Robert W.; and Bautz, Frederick H., 4,059,186, Cl. 198-481.000.
Casada, James H.: *See*—
Smith, Edward M.; Casada, James H.; and Taylor, Timothy H., 4,059,161, Cl. 172-60.000.
Casey, Donald James, to American Cyanamid Company. Method of minimizing tissue reaction during surgery with chitin. 4,059,097, Cl. 128-1.00R.
Cassano, James R.: *See*—
Stange, Klaus K.; Smith, Richard E.; Hamlin, Thomas J.; and Cassano, James R., 4,059,260, Cl. 271-3.000.
Caterpillar Tractor Co.: *See*—
Beyers, Marvin E.; and Dadds, Floyd S., 4,059,313, Cl. 305-19.000.
Bridwell, John W.; and Meiner, George H., III, 4,059,042, Cl. 91-469.000.
Gibson, Myron R., 4,059,370, Cl. 418-56.000.
Henson, Ralph B., 4,058,981, Cl. 60-605.000.
Stedman, Robert N., 4,059,163, Cl. 175-73.000.
Stedman, Robert N., 4,059,172, Cl. 187-9.00E.
Caw Industries, Inc.: *See*—
Willard, John Wesley, Sr., 4,059,691, Cl. 424-155.000.
Cawi, Ingo M. Transmission for driving a movable element, particularly a component in a machine tool, at high speed or creep speed. 4,059,029, Cl. 74-785.000.
Celanese Polymer Specialties Company: *See*—
Shimp, David Alan, 4,059,550, Cl. 260-29.40R.
Cellier, Michel Jean Jacques; Guitton, Jean-Claude; Scholle, Jean-Claude; and Viannay, Stephane Georges Jean-Marie, to Bertin & Cie. Cooled tunnel-furnace with ground effect. 4,059,399, Cl. 432-121.000.
Centaur Chemical Co.: *See*—
Avakian, Souren, 4,059,020, Cl. 73-425.40P.
Ceprini, Mario Q.: *See*—
Hoch, Samuel; Ceprini, Mario Q.; and Szabo, Emery, 4,059,562, Cl. 260-45.75S.
Chaisson, Maurice J., to Raymond Lee Organization, Inc., The. Tie rack. 4,059,191, Cl. 211-90.000.
Chalov, Alexandr Vasilievich: *See*—
Barannik, Ivan Andreevich; Kondratenko, Anatoly Borisovich; Trukhin, Alexandr Fedorovich; Raskatov, Viktor Georgievich; Zharovsky, Ivan Vasilievich; Rudakov, Viktor Alexandrovich; Mordkovich, Andrei Efremovich; and Chalov, Alexandr Vasilievich, 4,059,372, Cl. 425-8.000.
Champion, Robert J., to Perry Industries, Inc. Capsule cleaning and polishing. 4,058,868, Cl. 15-4.000.
Champion Spark Plug Company: *See*—
Lentz, Lawrence R., 4,059,782, Cl. 315-58.000.
Chang, Zung S.: *See*—
Carmi, Arieh; Chang, Zung S.; and Rayeski, Thomas J., 4,059,429, Cl. 65-355.000.
Chapman, Charles C.; and Hann, Paul D., to Phillips Petroleum Company. Cooling of recycle hydrocarbon and/or alkylate product in isoparaffin-olefin alkylation. 4,059,649, Cl. 260-683.480.
Chapman, Wayne A.: *See*—
Olson, Gregory J.; and Chapman, Wayne A., 4,059,221, Cl. 229-39.00R.
Chataigner, Jean; and Rader, Jean-Claude Joseph. Water purifying device without movable mechanical part in contact with the liquid to be treated. 4,059,524, Cl. 210-220.000.
Che-Wei, Liao. Water storage tank for flush toilets. 4,058,858, Cl. 4-67.00R.
Chembro Holdings (Proprietary) Limited: *See*—
Axcell, Barry Clifford; and Donninger, Cyril, 4,059,490, Cl. 195-99.000.
Chemetron Corporation: *See*—
Crompton, Charles E.; and Kazi, Abdulla M. Z., 4,059,540, Cl. 252-309.000.
Chemie-Anlagenbau Bischofsheim GmbH: *See*—
Hilterhaus, Karl Heinz, 4,059,659, Cl. 264-45.300.
Chernov, Zarem Sergeevich: *See*—
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Strahorn, David F.; and Goldstein, Roger F., 4,059,517, Cl. 210-73.00R.
Childs, William V., to Phillips Petroleum Company. Recovery of hexafluoroacetone from a hexafluoroacetone-HF control. 4,059,633, Cl. 260-593.00H.
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Choby, Edward G., Jr., to Allegheny Ludlum Industries, Inc. Method of soldering with phosphoric acid soldering flux. 4,059,218, Cl. 228-207.000.
Chodnekar, Madhukar Subraya; Pfiffner, Albert; Rigassi, Norbert; Schwieter, Ulrich; and Suchy, Milos, to Hoffmann-La Roche, Inc. Epoxy dodecadienamides. 4,059,600, Cl. 260-348.460.
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Furer, Richard; Halter, Paul; and Wettstein, Klaus, 4,059,074, Cl. 119-156.000.
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Nachbur, Hermann; and Rohringer, Peter, 4,059,532, Cl. 252-8.100.
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Rice, Seymour S., 4,059,493, Cl. 204-3.000.
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James, Lewis C., 4,059,502, Cl. 208-152.000.
Citizen Watch Co., Ltd.: *See*—
Tamaru, Munetaka; Kume, Kazunari; Oono, Hideshi; Watanabe, Minoru; Sato, Hideo; and Morokawa, Shigeru, 4,058,969, Cl. 58-23.0BA.
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Rosenberg, Ira E.; Ferguson, John A.; and Loveless, Norman P., 4,059,688, Cl. 424-71.000.
Clamans, Pedro Carlos Segismundo. Support arrangements for rotary scrapers. 4,058,876, Cl. 29-78.000.
Clark, Charles Albert, Jr., to RCA Corporation. CRT display with truncated Rho-Theta presentation. 4,059,785, Cl. 315-378.000.
Clark, Robert L.; and Dahan, Paul C., to Mobil Oil Corporation. Semisubmersible loading mooring and storage facility. 4,059,065, Cl. 114-256.000.
Clark, Wallace. Versatile fluid motor and pump. 4,059,165, Cl. 175-107.000.
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Hayden, Robert W.; and Clarridge, Glenn, 4,059,732, Cl. 179-18.00B.
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Cleary, James M. Apparatus and method for cutting elongated slots in earth formations. 4,059,309, Cl. 299-18.000.
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Ray, Ranjan; Tanner, Lee E.; and Cline, Carl F., 4,059,441, Cl. 75-174.000.
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Hausner, Franz, 4,058,874, Cl. 28-153.000.
Coach and Car Equipment Corporation: *See*—
Harder, Arthur J., Jr., 4,059,306, Cl. 297-452.000.

Coalite and Chemical Products Limited: *See*—
Langsley, Gerald William, 4,059,569, Cl. 260-48.000.
Cobb, Lawrence R. Heat saving concealed fireplace front. 4,059,091, Cl. 126-140.000.
Coburn, Robert E., to Molins Machine Company Inc. Glue mechanism. 4,059,474, Cl. 156-356.000.
Cocksedge, Kenneth W., to Xerox Corporation. Phase-sensitive transducer apparatus with signal offset means. 4,059,789, Cl. 318-608.000.
Cohen, Bernard: *See*—
Armstrong, Donald E.; Sindlinger, Ronald E.; Cohen, Bernard; Tozier, John E.; and Audesse, Emery G., 4,059,389, Cl. 431-95.00R.
Cohen, Kenneth W., to Bailey Meter Company. Proximity sensor with zero adjustment. 4,059,130, Cl. 137-82.000.
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Conger, Robert P.; and Pogozelski, Vincent F., to Congoleum Corporation. Processes of applying urethane top coatings to resilient floor coverings. 4,059,709, Cl. 427-264.000.
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Conklin, LeRoy T. Portable intrusion alarm. 4,059,832, Cl. 340-274.00R.
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Continental Oil Company: *See*—
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Yang, Kang; Reedy, James D.; and Scamehorn, John F., 4,059,675, Cl. 423-240.000.
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Warmka, Gary Paul, 4,059,775, Cl. 310-12.000.
Conway, Gerald A., to Gerald Conway & Co., Inc. Clip for dispensing advertising literature. 4,059,190, Cl. 211-57.100.
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Copolymer Rubber & Chemical Corporation: *See*—
Von Bodungen, George A.; and Meredith, Curtis L., 4,059,654, Cl. 260-897.00A.
Coppola, Louis. Locking device for securing an outboard motor to a boat. 4,058,994, Cl. 70-232.000.
Corbett, John M.; Skochdopole, Richard E.; and Scaggs, Anthony L., to Dow Chemical Company, The. Crosslinked styrene polymer foam having suppressed ignition properties. 4,059,545, Cl. 260-2.5FP.
Corbic, Yves Jean, to Societe a Responsabilite Limitee dite: TECCA. Apparatus for the production and deposition of bands. 4,059,377, Cl. 425-305.100.
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Carmi, Arieh; Chang, Zung S.; and Rayeski, Thomas J., 4,059,429, Cl. 65-355.000.
Reade, Richard F., 4,059,454, Cl. 106-39.700.
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Morro, William Charles; Hakka, Leo Ernest; Brophy, James Mackay; Hebrard, Michel Jacques Roger; and Courtes, Jean Claude, 4,059,534, Cl. 252-32.70E.
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Cragoe, Edward J., Jr.; and Bicking, John B., to Merck & Co., Inc. 8-Halo-11,12-secoprostaglandins. 4,059,601, Cl. 260-408.000.
Cragoe, Edward J., Jr.; and Bicking, John B., to Merck & Co., Inc. 8-Methyl-, phenyl-, or substituted phenyl-11,12-secoprostaglandins. 4,059,602, Cl. 260-408.000.
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Crall, Frederick William: *See*—
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Meier, Ernst; Credner, Hans Heinrich; Lassig, Wolfgang; Kuffner, Karl; and Schranz, Karl-Wilhelm, 4,059,447, Cl. 96-56.400.
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Crissman, James H.; Fritsche, G. Ray; Hamel, Frederick B.; and Hilty, Lloyd W., to Gulf Research & Development Company. Radial flow electrostatic filter. 4,059,498, Cl. 204-188.000.
Crompton, Charles E.; and Kazi, Abdulla M. Z., to Chemetron Corporation. Process for making colloidal sols of antimony pentoxide in polar organic solvents. 4,059,540, Cl. 252-309.000.
Crowe, Talmadge L., to Baker International Corporation. Well control valve apparatus. 4,059,157, Cl. 166-317.000.
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Cull, Neville L., to Exxon Research & Engineering Co. Flue gas desulfurization sorbent and process. 4,059,418, Cl. 55-73.000.
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Damon Corporation: *See*—
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Danchenko, Mikhail Evgenievich: *See*—
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Geller, Thomas L.; and Rabinowitz, Harold, 4,059,464, Cl. 156-66.000.
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Davis, Belford L. Resuscitative device. 4,059,099, Cl. 128-28.000.
Davis, Charles McRea, Jr. Can crusher. 4,059,050, Cl. 100-91.000.
Davis, John: *See*—
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Davis, Trevor Crombie Maitland; and Laurie, James Ernest, to Revere Copper and Brass Incorporated. Method of digesting bauxite via the Bayer process with the addition of reducing agents. 4,059,672, Cl. 423-121.000.
Davis, William Lawrence. Apparatus for cutting pipe insulation. 4,059,035, Cl. 83-1.000.
Dawson, John Myrick, to TRW Inc. Separation of isotopes by time of flight. 4,059,761, Cl. 250-287.000.
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Kowalski, Daniel C.; Dawson, Juan C.; and Krulikoski, Stanley J., deceased, 4,059,343, Cl. 350-182.000.

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Dayco Corporation: *See—*
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Dean, Geoffrey J.: *See—*
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Dean, Rudy. Frames for buildings. 4,058,951, Cl. 52-656.000.

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de Laage de Meux, Patrick M.; and Maitre, Michel J., to Lignes Telegraphiques et Telephoniques. Phase lock loop carrier generator for receiver of phase modulated carrier pulse signals. 4,059,805, Cl. 329-50.000.

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Del Pesco, Thomas Wayne; and Weigert, Frank Julian, to Du Pont de Nemours, E. I., and Company. Preparation of aromatic amines. 4,059,628, Cl. 260-581.000.

Demarcq, Michel, to Produits Chimiques Ugine Kuhlmann. Processes for neutralizing 2,3-dibromopropanol phosphoric acid esters contained in tris(2,3-dibromo-1-propyl) phosphate. 4,059,656, Cl. 260-990.000.

DeMarinis, Robert M.; and Weisbach, Jerry A., to SmithKline Corporation. 7-Substituted mercaptoacetamido cephamycins. 4,059,578, Cl. 544-21.000.

de Nora, Oronzio; and de Nora, Vittorio, to Oronzio de Nora Impianti Elettrochimici S.p.A. Method of electrolyte feeding and recirculation in an electrolysis cell. 4,059,495, Cl. 204-98.000.

de Nora, Vittorio: *See—*
de Nora, Oronzio; and de Nora, Vittorio, 4,059,495, Cl. 204-98.000.

DePriest, Donald R.; Brandon, Bobby C.; and Buie, Connell M., to Humboldt Products Corporation. Apparatus, process and product. 4,059,104, Cl. 128-132.00D.

De Roeck, Joseph Irma; and Pira, Francois Jean, to AGFA-GEVAERT N.V. Air flotation turner bar. 4,059,241, Cl. 242-75.500.

DeRooy, Felix J.; Daniel, Thell D.; Annes, Erle C.; and Arnold, Billy G., to United States Gypsum Company. Composition for accelerating the setting of calcined gypsum and the product formed thereby. 4,059,456, Cl. 106-114.000.

Derr, Walter R.; McClernon, Joseph R.; McGovern, Stephen J.; and Smith, Fritz A., to Mobil Oil Corporation. Method for upgrading synthetic oils boiling above gasoline boiling material. 4,059,648, Cl. 260-676.00R.

DeStephanis, Ralph, to RCA Corporation. Stylus arm lifting/lowering apparatus for a video disc player system. 4,059,277, Cl. 274-23.00A.

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Deutsche Gold-und Silber-Scheideanstalt Vormals Roessler: *See—*
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Deutsche Gold- und Silber-Schneideanstalt vormals Roessler: *See—*
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Devas, Michael Bertrand, to National Research Development Corporation. Bone securing devices. 4,059,102, Cl. 128-92.00B.

De Vault, Albert N.; and Holtz, Hans D., to Phillips Petroleum Company. Ashless detergent additives for fuels and lubricants. 4,059,535, Cl. 252-33.000.

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De Vincentiis, Girolamo: *See—*
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De Vos, Daniel; Michel, Paul-Marie; and Berger, Alfred, to Sovitec S.A. Process for the preparation of expansible beads. 4,059,423, Cl. 65-21.000.

Dewald, James R.; and Markley, Lowell D., to Dow Chemical Company, The. Preferential alkylation or acylation of meta-disubstituted benzenes. 4,059,642, Cl. 260-650.00R.

Dewar, John H.: *See—*
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Dickey, Baron Christian, to Alpha Marine Systems, Inc. Marine auto pilot. 4,059,064, Cl. 114-144.00E.

Dickinson, Peter D.; Osborne, Thomas E.; Rode, France; and Baum, Allen J., to Hewlett-Packard Company. General purpose calculator having selective data storage, data conversion and time-keeping capabilities. 4,059,750, Cl. 364-715.000.

Dickson, Robert Daniel. Means of fumigating raw and finished agricultural products. 4,059,048, Cl. 99-482.000.

Diebold, Incorporated: *See—*
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Dierker, Jeffrey A.; and Moore, Prentice G., to F. W. Bell, Inc. Method and apparatus for measuring the current flowing in a workpiece. 4,059,798, Cl. 324-127.000.

Diesner, Ferdinand; and Bucher, Robert. Weft insert apparatus for ribbon looms. 4,059,133, Cl. 139-440.000.

Dietrich, Roland, to Ahiba AG. Laboratory test device for textile samples. 4,059,013, Cl. 73-159.000.

Digman, Robert Howard, Sr., to Raymond Lee Organization, Inc., The. Disposable fly killer container. 4,058,928, Cl. 43-131.000.

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Diminnie, Edward A.; and Dellario, Patrick J., to General Electric Company. Terminal protection shield. 4,059,325, Cl. 339-94.00A.

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Dion, Narcisse, to B. & R. Choiniere Ltee. Forage harvester. 4,059,233, Cl. 241-47.000.

Dittrich, Werner; and Schnippering, Friedhelm, to Dynamit Nobel Aktiengesellschaft. Method of making molds for the casting of metals. 4,059,453, Cl. 106-38.300.

Dix, James S.: *See—*
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Dr. -Ing. Ludwig Pietzsch: *See—*
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Doerman, Eryk Stefan: *See—*
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Doerre, Erhard; Semlitsch, Manfred; and Frey, Otto, to Sulzer Brothers Limited. Joint endoprosthesis. 4,058,856, Cl. 3-1.910.

Dohgane, Iwao: *See—*
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Dominion Foundries and Steel, Limited: *See—*
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Doncaster, Peter Henry: *See—*
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Donnelly, Frank R. Expansion of building structure. 4,058,952, Cl. 52-741.000.

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Dorr-Oliver Incorporated: *See—*
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Dow Chemical Company, The: *See—*
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Corbett, John M.; Skochdopole, Richard E.; and Scaggs, Anthony L., 4,059,545, Cl. 260-2.5FP.
Dewald, James R.; and Markley, Lowell D., 4,059,642, Cl. 260-650.00R.
Grosshandler, Sandor, 4,059,528, Cl. 210-282.000.
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Draiswerke GmbH: *See—*
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Dressell, Richard G., Jr.; and Heideman, Robert J. Linear force shock absorber. 4,059,175, Cl. 188-285.000.

Dresser Industries, Inc.: *See—*
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Drevet, Georges. Sewing machine having a dual-purpose complementary case. 4,059,062, Cl. 112-258.000.

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Duncan, James C.: *See—*
Anders, Walter G.; Cole, Michael A.; Duncan, James C.; and Leipelt, Paul A., 4,059,246, Cl. 243-7.000.
Duncan, Robert John; and Elliott, Richard Montgomery, to USM Corporation. System for dispensing and controlling the temperature of hot melt adhesive. 4,059,204, Cl. 222-146.0HE.
Dunham-Bush, Inc.: *See—*
Shaw, David N., 4,058,988, Cl. 62-160.000.
Dunkerley, Charles L.: *See—*
Foster, J. Walter; and Dunkerley, Charles L., 4,059,359, Cl. 356-222.000.
Dunogues, Jacques: *See—*
Calas, Raymond; Dunogues, Jacques; Deleris, Gerard; Lefort, Marcel; and Simonnet, Christian, 4,059,608, Cl. 260-448.20E.
Du Pont de Nemours, E. I., and Company: *See—*
Bellina, Russell Frank, 4,059,623, Cl. 260-561.00A.
Del Pesco, Thomas Wayne; and Weigert, Frank Julian, 4,059,628, Cl. 260-581.000.
Gavin, John Henry; and Spickler, John Martin, 4,058,881, Cl. 29-715.000.
Higgins, James Francis, 4,059,459, Cl. 106-298.000.
Pangonis, William James, 4,059,667, Cl. 264-289.000.
Wolf, Anthony David, 4,059,434, Cl. 71-92.000.
Dupre, Herman K. Hip mounted tethered ball game. 4,059,271, Cl. 273-95.00A.
Dustin, Donald L.: *See—*
Mino, George M.; and Dustin, Donald L., 4,059,711, Cl. 427-310.000.
Dynamit Nobel Aktiengesellschaft: *See—*
Blumenfeld, Georg; Richtzenhain, Hermann; Vogt, Wilhelm; and Volkommer, Norbert, 4,059,618, Cl. 560-221.000.
Dittrich, Werner; and Schnippering, Friedhelm, 4,059,453, Cl. 106-38.300.
E D T Supplies Limited: *See—*
Fleet, Bernard, 4,059,406, Cl. 23-230.00R.
E. J. Brooks Company: *See—*
Moberg, Sigurd Manfred; and Lundberg, George A., 4,059,300, Cl. 292-322.000.
Earle, Paul Lewis; and Snider, George William, to Johns-Manville Corporation. Fire resistant joint system for concrete structures. 4,058,947, Cl. 52-396.000.
Eastman Kodak Company: *See—*
Brizzolara, Ernest E., 4,059,211, Cl. 226-11.000.
Hochreiter, William Thomas; Craig, Loren Jackson; and Mindler, Fredric A., 4,059,836, Cl. 354-29.000.
Roller, Thomas W., 4,059,520, Cl. 210-184.000.
Eastwood, Brian Geoffrey, to Hall & Hall Limited. Seal ring assembly. 4,059,280, Cl. 277-188.00A.
Eberl, Karlheinz: *See—*
Hollweck, Walter; Schnee, Wilhelm; Eberl, Karlheinz; and Basel, Werner, 4,059,817, Cl. 337-365.000.
Ebert, Michael: *See—*
Reick, Franklin G., 4,059,018, Cl. 73-418.000.
Eck, Herbert; Weinhold, Gunter; and Hannebaum, Manfred, to Wacker-Chemie GmbH. Manufacture of polyvinyl chloride foams. 4,059,661, Cl. 264-54.000.
Eddy, Wesley L.; Mullen, Daniel J.; and Bonham, Arthur R., to Martin Marietta Aerospace. Method and system for selectively accessing multiplexed data transmission network for monitoring and testing of the network. 4,059,729, Cl. 179-15.0BF.
Edgar, John B.; and Bell, Peter W. Method of forming carpet tiles. 4,059,465, Cl. 156-72.000.
Edwards, Frank E. Amalgam retriever. 4,058,897, Cl. 32-40.00R.
Eggensperger, Heinz; Beilfuss, Wolfgang; and Ehlers, Helmut Hermann, to Sterling Drug Inc. 2,5-Bis(benzyloxy)tetrahydrofuran. 4,059,596, Cl. 260-347.800.
Eheim, Franz, to Robert Bosch G.m.b.H. Fuel injection pump. 4,059,369, Cl. 417-494.000.
Ehlers, Helmut Hermann: *See—*
Eggensperger, Heinz; Beilfuss, Wolfgang; and Ehlers, Helmut Hermann, 4,059,596, Cl. 260-347.800.
Eiland, P. Frank: *See—*
Spanel, Abram N.; Eiland, P. Frank; and Jacobs, David R., 4,059,021, Cl. 74-89.200.
Eisend, Ewald: *See—*
Schulz, Horst; Flosser, Josef; Kessler, Reinhard; Schmidt, Karl-Heinz; Eisend, Ewald; Hild, Erich; Loffler, Karl-Heinz; and Steuer, Werner, 4,059,028, Cl. 74-781.00B.
Eisenhardt, Frank B.; and Muehlberger, Stanislaus F., to Mobil Oil Corporation. Phosphate ore flotation. 4,059,509, Cl. 209-166.000.
Eisenhauer, Leigh E., to Eisenhauer Manufacturing Company, The. Lift with electrical grounding means. 4,059,846, Cl. 361-212.000.
Eisenhauer Manufacturing Company, The: *See—*
Eisenhauer, Leigh E., 4,059,846, Cl. 361-212.000.
Eisenmann, Siegfried: *See—*
Harle, Hermann; and Eisenmann, Siegfried, 4,058,938, Cl. 51-287.000.
Eising, John P., to A. O. Smith Corporation. Combustion heating apparatus to improve operation of gas pilot burners. 4,059,386, Cl. 431-43.000.
Eitel, Richard P. Optical instrument and viewing method. 4,059,347, Cl. 350-319.000.
Elbe, Ronald E.; Krolak, Donald W.; and Vernon, Philip L., to United States of America, Army. Rifle adapter assembly. 4,058,922, Cl. 42-16.000.
Elderton, Peter P., to International Telephone and Telegraph Corporation. Net oil computer or the like. 4,059,744, Cl. 235-92.0FL.
Eleanor & Wilson Greatbatch Foundation: *See—*
Greatbatch, Wilson; Mead, Ralph T.; McLean, Robert L.; Rudolph, Frank W.; and Frenz, Norbert W., 4,058,889, Cl. 29-623.500.
Electricity Council, The: *See—*
Miles, Lyndon James; and Jones, Ivor Wynn, 4,059,663, Cl. 264-65.000.
Elex A.G.: *See—*
Frauenfelder, Alfred; and Huppi, Xaver Johann, 4,059,420, Cl. 55-112.000.
Elfert, Klaus; Hinz, Jurgen; and Binsack, Rudolf, to Bayer Aktiengesellschaft. Sulphonated polybenz-1,3-oxazin-2,4-diones. 4,059,580, Cl. 544-73.000.
Elkem-Spigerverket A/S: *See—*
Jahnsen, Knut Waldemar, 4,059,514, Cl. 210-49.000.
Ellingham, Bruce: *See—*
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Elliott, Michael T.: *See—*
Kobayashi, Tsutomu; Archer, John L.; and Elliott, Michael T., 4,059,828, Cl. 365-32.000.
Elliott, Richard Montgomery: *See—*
Duncan, Robert John; and Elliott, Richard Montgomery, 4,059,204, Cl. 222-146.0HE.
Ellwood, Henry, to USM Corporation. Extrusion machine having collar for seal. 4,059,206, Cl. 222-413.000.
Eltra Corporation: *See—*
Bailey, William R., 4,059,334, Cl. 339-258.00F.
Emery Company, Inc.: *See—*
Korff, Wolfram G.; Emery, Vernon V.; Bond, Joseph Kim; and Marcella, Joseph, 4,059,379, Cl. 425-393.000.
Emery, Vernon V.: *See—*
Korff, Wolfram G.; Emery, Vernon V.; Bond, Joseph Kim; and Marcella, Joseph, 4,059,379, Cl. 425-393.000.
Encotech, Inc.: *See—*
Kindl, Fred Henry, 4,058,976, Cl. 60-39.46S.
Engels, Kaspar, to Draiswerke GmbH. Stirring or agitating mills. 4,059,232, Cl. 241-46.170.
Environmental Research Institute of Michigan: *See—*
Turpening, Roger M., 4,059,820, Cl. 340-15.5SW.
Environmental Research & Technology, Inc.: *See—*
Kebabian, Paul L., 4,059,356, Cl. 356-204.000.
Epperson, Ronald D., to Hughes Aircraft Company. Digital wristwatch and stopwatch. 4,058,971, Cl. 58-39.500.
Epstein, Max, to Northwestern University. Passive transponders using acoustic surface wave devices. 4,059,831, Cl. 343-6.80R.
Erasmus, Frans P. G., to Smith Kline & French (Proprietary) Limited. Apparatus and method for oral dosing. 4,059,111, Cl. 128-223.000.
Erdelyi, Frank F. Method and apparatus for the production of machine tools. 4,059,031, Cl. 76-108.00R.
Erdmannsdorff, Max Von: *See—*
McBrayer, Doyle C., 4,058,940, Cl. 52-104.000.
Erdolchemie GmbH: *See—*
Hausweiler, Arnold; Mayer, Adolf; and Bitners, Feliks, 4,059,492, Cl. 203-11.000.
Erickson, John W.: *See—*
Andersen, Poul H.; and Erickson, John W., 4,059,364, Cl. 415-89.000.
Eriksson, Sven Willner, to AB Bofors. Logic controlled integrator. 4,059,751, Cl. 364-829.000.
Ernesto Guglielmo Pagnozzi: *See—*
Pagnozzi, Vincenzo, 4,058,906, Cl. 34-16.500.
Ernst, Horst Manfred; Olschewski, Armin; Schurger, Rainer; Walter, Lothar; Brandenstein, Manfred; and Burkl, Erich, to SKF Industrial Trading and Development Company B.V. Self-centering clutch bearing. 4,059,179, Cl. 192-98.000.
ESB Incorporated: *See—*
Bredland, Alf Marlov; Fong, Walter Lee; Messing, Terry Glen; and Paulson, John Walter, 4,059,717, Cl. 429-162.000.
Messing, Terry Glen, 4,059,718, Cl. 429-162.000.
Esche, Delbert Eugene. Apparatus for forming shell molds. 4,059,144, Cl. 164-166.000.
Escher Wyss Limited: *See—*
Lehmann, Rolf, 4,058,877, Cl. 29-116.0AD.
Lehmann, Rolf, 4,058,878, Cl. 29-116.0AD.
Eschweiler Bergwerks-Verein Aktiengesellschaft: *See—*
Goossens, Walter; Hermann, Wolfgang; Keusch, Wilhelm; and Redlich, Rudolf, 4,059,412, Cl. 44-10.00H.
Esibian, Eduard Migranovich; Dudko, Daniil Andreevich; Danchenko, Mikhail Evgenievich; Malkin, Vasily Berkovich; and Kozhema, Valery Andreevich. Plasma arc cutting torch. 4,059,743, Cl. 219-121.00P.
Espinosa, Gerald P., to Rockwell International Corporation. Piezoelectric material. 4,059,537, Cl. 252-62.900.
Esquilat, Georges, to Bombardier Limited. Lightweight trail groomer. 4,058,913, Cl. 37-50.000.
Etat Francais Represente par de Delegue Ministeriel pour l'Armement: *See—*
Teissier, Etienne Leon Norbert, 4,059,360, Cl. 403-2.000.
Etter, Peter; and Faust, Werner, to BBC Brown Boveri & Company Limited. Method for producing rectifier with switches of asymmetric voltage breakdown strengths. 4,059,792, Cl. 363-135.000.

Evans, Dafydd W., to Towmotor Corporation. Mounting assembly for a controllably movable fluid tank. 4,059,281, Cl. 280-5.00A.
Exxon Nuclear Company, Inc.: *See—*
Bupp, Lamar P.; and Sofer, George A., 4,059,484, Cl. 176-78.000.
Exxon Production Research Company: *See—*
Kostelnicek, Richard J., 4,059,818, Cl. 340-15.5DP.
Exxon Research & Engineering Co.: *See—*
Cull, Neville L., 4,059,418, Cl. 55-73.000.
Oswald, Alexis A., 4,059,570, Cl. 260-77.5AP.
Schlosberg, Richard H.; Gorbaty, Martin L.; and Lang, Robert J., 4,059,410, Cl. 44-1.00R.
Smith, William S., Jr., 4,059,651, Cl. 260-848.000.
Ezawa, Sadaaki: *See—*
Obayashi, Nobuharu; Hashizume, Hikaru; Sakashita, Noriji; Kameyama, Seiji; Ezawa, Sadaaki; Kugisawa, Toshio; Washiyama, Yutaka; Kondo, Tatsunori; and Watanabe, Hironori, 4,059,040, Cl. 84-1.030.
F. L. Smidth & Co.: *See—*
Dano, Tage Halfdan, 4,059,396, Cl. 432-78.000.
Touborg, Jorn, 4,059,392, Cl. 432-58.000.
F. W. Bell, Inc.: *See—*
Dierker, Jeffrey A.; and Moore, Prentice G., 4,059,798, Cl. 324-127.000.
Fairchild Camera and Instrument Corporation: *See—*
Phy, William S., 4,058,899, Cl. 33-26.000.
Falcone, Joseph R., to Syracuse Plastics, Inc. Annular metal fitting for rigid plastic part. 4,059,294, Cl. 285-238.000.
Fan, John C. C.; and Zeiger, Herbert J., to Massachusetts Institute of Technology. Method for improving the crystallinity of semiconductor films by laser beam scanning and the products thereof. 4,059,461, Cl. 148-1.500.
Fanelli, Anthony: *See—*
Sze, Morgan C.; Schindler, Harvey D.; and Fanelli, Anthony, 4,059,503, Cl. 208-254.00H.
Faria, Thomas G. Tachometer apparatus. 4,059,799, Cl. 324-169.000.
Farley, David L.: *See—*
Nix, George J.; Barrington, Burchus Q.; Farley, David L.; and Hortman, Norman G., 4,059,153, Cl. 166-264.000.
Farris, Ralph J. Self-stabilizing drilling tool. 4,059,164, Cl. 175-73.000.
Fasline Food Equipment Co.: *See—*
Gerson, Samuel L.; and Jones, Frank W., 4,059,037, Cl. 83-407.000.
Faust, Werner: *See—*
Etter, Peter; and Faust, Werner, 4,059,792, Cl. 363-135.000.
Fawcett, John Neville; and Nicol, Stuart William, to National Research Development Corporation. Drive assembly. 4,059,022, Cl. 74-226.000.
Feder, Joseph: *See—*
Tolbert, William R.; and Feder, Joseph, 4,059,485, Cl. 195-1.800.
Feilchenfeld, Michal M., to Westinghouse Electric Corporation. Digital monitor. 4,059,749, Cl. 235-302.000.
Feinwerkbau Helfer & Co. KG: *See—*
Hornung, Ewald, 4,059,034, Cl. 81-57.370.
Feis, Nikolaas, to Nederlandsche Organisatie Voor Toegepast-Natuurwetenschappelijk Onderzoek Ten Behoeve Van Nijverheid. Cylindrical body provided with means for counteracting vibrations resulting from a transversely flowing fluid. 4,059,129, Cl. 138-37.000.
Fellner, Erwin J., to Sierra Engineering Co. Dust protective assembly for breakaway connectors. 4,059,322, Cl. 339-44.00R.
Felten & Guilleaume Kabelwerke Aktiengesellschaft: *See—*
Adler, Horst; Grella, Werner; and Israel, Hans-Peter, 4,059,722, Cl. 174-19.000.
Ferdico, Vincent. Swimming glove. 4,058,863, Cl. 9-308.000.
Ferguson, John A.: *See—*
Rosenberg, Ira E.; Ferguson, John A.; and Loveless, Norman P., 4,059,688, Cl. 424-71.000.
Ferm, Stig; and Torstenfelt, Ragnar, to Stal-Laval Turbin AB. Apparatus for starting turbine plants. 4,058,973, Cl. 60-39.09R.
Fiat Trattori S.p.A.: *See—*
Shelton, Peter Alfred, 4,059,283, Cl. 280-461.00A.
Fichtel & Sachs AG: *See—*
Schulz, Horst; Flosser, Josef; Kessler, Reinhard; Schmidt, Karl-Heinz; Eisend, Ewald; Hild, Erich; Loffler, Karl-Heinz; and Steuer, Werner, 4,059,028, Cl. 74-781.00B.
Fielding, Ivor R.: *See—*
Slama, Francis J.; and Fielding, Ivor R., 4,059,650, Cl. 260-837.00R.
Fielding-Russel, George Samuel; and Gent, Alan N., to Goodyear Tire & Rubber Company, The. Energy absorbing unit. 4,059,254, Cl. 267-140.000.
Fields, Larry: *See—*
Morris, Earl Lavern; and Fields, Larry, 4,059,289, Cl. 285-56.000.
Fink, Lothar: *See—*
Koch, Friedrich; and Fink, Lothar, 4,059,375, Cl. 425-589.000.
Firestone Tire & Rubber Company, The: *See—*
Lawson, David Francis; and Kay, Edward Leo, 4,059,560, Cl. 260-45.70R.
Fischer, Edward T., to Raymond Lee Organization, Inc., The. Curtain and drape holder. 4,058,873, Cl. 24-73.0CH.
Fischer & Porter Co.: *See—*
Gaertner, Max H., 4,059,745, Cl. 364-108.000.
Satori, Toshio, 4,059,015, Cl. 73-209.000.
Fleet, Bernard, to E D T Supplies Limited. Electrochemical detector system. 4,059,406, Cl. 23-230.00R.
Floessel, Carl Dieter, to BBC Brown Boveri & Company Limited. Apparatus for changing the direction of a three-phase pipe-type gas-pressurized electrical cable. 4,059,723, Cl. 174-21.00R.
Floral Innovations, Inc.: *See—*
O'Connell, Donald L., 4,058,929, Cl. 47-41.120.
Flosser, Josef: *See—*
Schulz, Horst; Flosser, Josef; Kessler, Reinhard; Schmidt, Karl-Heinz; Eisend, Ewald; Hild, Erich; Loffler, Karl-Heinz; and Steuer, Werner, 4,059,028, Cl. 74-781.00B.
Flourny, Kenoth H.: *See—*
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Flumm, Paul: *See—*
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FMC Corporation: *See—*
Bunnelle, Philip R., 4,059,166, Cl. 175-232.000.
Gibbons, Loren Kenneth, 4,059,433, Cl. 71-90.000.
Konz, Marvin Joseph, 4,059,594, Cl. 260-340.700.
Winkley, Donald Charles, 4,059,678, Cl. 423-273.000.
Folberth, Otto G., to International Business Machines Corporation. Controllable semiconductor element. 4,059,814, Cl. 333-29.000.
Fong, Walter Lee: *See—*
Bredland, Alf Marlov; Fong, Walter Lee; Messing, Terry Glen; and Paulson, John Walter, 4,059,717, Cl. 429-162.000.
Food Systems, Inc.: *See—*
Greenfield, Irving E., Jr.; and Jacobson, Ronald C., 4,059,181, Cl. 194-13.000.
Ford, Bacon & Davis, Incorporated: *See—*
Gambs, Gerard C.; and Morgan, Horace P., 4,059,060, Cl. 110-1.00J.
Ford, Donald T., to Arnold Engineering Company, The. Coating apparatus. 4,059,069, Cl. 118-642.000.
Ford Industries, Inc.: *See—*
Hayden, Robert W.; and Clarridge, Glenn, 4,059,732, Cl. 179-18.00B.
Ford Motor Company: *See—*
Allison, William D., 4,059,361, Cl. 403-77.000.
Coughlan, Standly T.; Dewar, John H.; and Zampa, Henry A., 4,059,564, Cl. 264-46.400.
Forgione, Joseph. Window security apparatus. 4,059,413, Cl. 49-56.000.
Forrest, Charles P. Agility running obstacle device. 4,059,268, Cl. 273-55.00R.
Foster, Graham Terence, to Linread Limited. Machines for handling and assembling fasteners and washers. 4,058,866, Cl. 10-155.00A.
Foster, J. Walter; and Dunkerley, Charles L., to Grumman Aerospace Corporation. Method and apparatus for quantizing radiation beams by optical diffraction. 4,059,359, Cl. 356-222.000.
Foster, John A., to J. L. Clark Manufacturing Co. Container closure with foil seal. 4,059,201, Cl. 220-258.000.
Foster, Terence; and Dawson, Thomas Stephen, to American Cyanamid Company. Synthesis of dimethylaminoethyl methylmethacrylate. 4,059,617, Cl. 560-222.000.
Foulletier, Louis; Pechmeze, Jacques Pierre Edmond; and Sureau, Robert Frederic Michel, to Produits Chimiques Ugine Kuhlmann. Trifluoroethylanilines. 4,059,626, Cl. 260-578.000.
Foulletier, Louis; and Lalu, Jean-Pierre, to Produits Chimiques Ugine Kuhlmann. Perfluoroaliphatic substituted amine mixtures and the method for preparing the same. 4,059,629, Cl. 260-583.0GG.
Foundation: The Research Institute of Electric and Magnetic Alloys, The: *See—*
Masumoto, Hakaru; Murakami, Yuetsu; and Nakamura, Naoji, 4,059,462, Cl. 148-31.550.
Fowler, Leslie L. Method of converting oil and waste containing sludge to dry waste. 4,059,666, Cl. 264-129.000.
Fowler, William J.; Heberle, Richard A.; Tonkyn, Richard G.; and Vorchheimer, Norman, to Betz Laboratories, Inc. Process for clarification of oil-containing waste. 4,059,515, Cl. 210-51.000.
Franek, Jozef Tadeusz; and Doncaster, Peter Henry, to Metal Box Limited. Containers. 4,058,998, Cl. 72-84.000.
Frauenfelder, Alfred; and Huppi, Xaver Johann, to Elex A.G. Bearings and rapping shaft in electrostatic precipitator. 4,059,420, Cl. 55-112.000.
Frenz, Norbert W.: *See—*
Greatbatch, Wilson; Mead, Ralph T.; McLean, Robert L.; Rudolph, Frank W.; and Frenz, Norbert W., 4,058,889, Cl. 29-623.500.
Frey, Otto: *See—*
Doerre, Erhard; Semlitsch, Manfred; and Frey, Otto, 4,058,856, Cl. 3-1.910.
Fritsch, Robert E., to Micro-Copy, Inc. Micro-composing reduction printer. 4,059,355, Cl. 355-43.000.
Fritsche, G. Ray: *See—*
Crissman, James H.; Fritsche, G. Ray; Hamel, Frederick B.; and Hilty, Lloyd W., 4,059,498, Cl. 204-188.000.
Frodermann, Gerd: *See—*
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Froelich, August: *See—*
Hitzler, Otto; Pennewiss, Horst; Froelich, August; Markert, Gerhard; and Wunderlich, Winfried, 4,059,574, Cl. 260-192.000.
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Takematsu, Tetsuo; Konnai, Makoto; Takeda, Makoto; Fuga, Nobuhiko; Ikeda, Kaoru; and Shugaya, Kiyoshi, 4,059,432, Cl. 71-87.000.

Fuji Photo Film Co., Ltd.: *See—*
Aonuma, Masashi; Kitamoto, Tatsuji; and Akashi, Goro, 4,059,463, Cl. 148-105.000.
Sato, Masamichi, 4,059,445, Cl. 96-35.000.
Sugiyama, Masatoshi; Kato, Eiichi; and Nakamura, Yasuharu, 4,059,448, Cl. 96-84.00A.
Fujikura, Yoshiaki: *See—*
Inamoto, Yoshiaki; Fujikura, Yoshiaki; Tsuchihashi, Kiyoshi; and Kashihara, Eiji, 4,059,643, Cl. 260-666.0PY.
Fujimi Kenmazai Kogyo Kabushiki Kaisha: *See—*
Yamaguchi, Yoshinobu; Kitano, Nanahiko; Watanabe, Yoshihisa; and Imanari, Makoto, 4,059,544, Cl. 252-471.000.
Fujimoto, Sakae, to Ricoh Co., Ltd. Sheet delivery apparatus. 4,059,262, Cl. 271-35.000.
Fujisoku Electric Co., Ltd.: *See—*
Mizutani, Masumi; Hata, Hiromichi; and Shimazaki, Masasuke, 4,059,006, Cl. 73-17.00A.
Fukuda, Tokiharu: *See—*
Morita, Akiyoshi; Hayasaka, Tamio; Shimizu, Kunio; and Fukuda, Tokiharu, 4,059,143, Cl. 164-113.000.
Fund, Harry, to Modular Products Corporations (Labelmaster Division). Vehicle placarding apparatus. 4,058,918, Cl. 40-129.00C.
Funk, David C., to University of Iowa Research Foundation. Apparatus for teaching the structures and projection of arterial systems. 4,058,910, Cl. 35-17.000.
Furer, Richard; Halter, Paul; and Wettstein, Klaus, to Ciba-Geigy Corporation. Device and process for the control of ear ticks. 4,059,074, Cl. 119-156.000.
Furman, Motel Khaimovich: *See—*
Jumashev, Georgy Stepanovich; and Furman, Motel Khaimovich, 4,059,115, Cl. 128-317.000.
Furness, Bernard J.; Cousins, John R.; and Tuft, Dennis, to British Steel Corporation. Method and apparatus for monitoring pass alignment in rolling mills. 4,059,794, Cl. 324-208.000.
Furstlich Hohenzollernsche Huttenver Waltung Laucherthal: *See—*
Harle, Hermann; and Eisenmann, Siegfried, 4,058,938, Cl. 51-287.000.
Furuno, Fumiya: *See—*
Uchino, Hisanori; Takada, Masamichi; Shimizu, Takahiro; Shibayama, Masamitsu; and Furuno, Fumiya, 4,059,196, Cl. 214-138.00R.
G & H Technology, Inc.: *See—*
Phillips, John J.; and Stephenson, Roger, 4,059,332, Cl. 339-113.00R.
Gabriele, Leonard A., to Lear Siegler, Inc. Gear rolling equipment. 4,058,999, Cl. 72-102.000.
Gaertner, Max H., to Fischer & Porter Co. Override process control system. 4,059,745, Cl. 364-108.000.
Gair, Robert: *See—*
Gerbault, Marcel; and Gair, Robert, 4,058,987, Cl. 61-86.000.
Galer, Herbert W., to United States Steel Corporation. Injection mold for molding internally threaded plastic article. 4,059,249, Cl. 249-58.000.
Gamble, Bruce. Newspaper recycling apparatus and method. 4,059,222, Cl. 229-54.00R.
Gambs, Gerard C.; and Morgan, Horace P., to Ford, Bacon & Davis, Incorporated. Method and apparatus for coal treatment. 4,059,060, Cl. 110-1.00J.
Gannaway, Edwin L., to Tecumseh Products Company. Thermal overload protective system. 4,059,366, Cl. 417-32.000.
Garbalizer Corporation of America: *See—*
Brewer, John C., 4,059,236, Cl. 241-243.000.
Garrett Corporation, The: *See—*
Mackay, Robin, 4,059,770, Cl. 290-4.00C.
Gaudette, Roger Robert; Ohlson, John Leonard; and Scanlon, Patricia Marie, to W. R. Grace & Co. Hexahydropyrimidine-1,3-diacetonitriles and processes for preparing the same. 4,059,548, Cl. 260-251.00R.
Gavin, John Henry; and Spickler, John Martin, to Du Pont de Nemours, E. I., and Company. Application machine for mounting circuit board pins with an improved control system. 4,058,881, Cl. 29-715.000.
Gay, Michel J. L., to Office National d'Etudes et de Recherches Aerospatiales. A.C. capacitance measuring bridge. 4,059,797, Cl. 324-60.00C.
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Lipp, Eberhard; and Jurgens, Hans-Hermann, 4,058,907, Cl. 34-61.000.
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Kolling, Helmut; Rappen, Friedrich; and Geiser, Nikolaus, 4,059,720, Cl. 526-74.000.
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Settlemyer, Bernard W.; Knappenberger, Clifford W.; and Bader, Alfred, 4,059,017, Cl. 73-395.000.
General Electric Company: *See—*
Banker, Robert O.; and Holshouser, Howard E., 4,059,838, Cl. 358-27.000.
Cooper, Glenn Dale, 4,059,568, Cl. 260-47.0ET.
Diminnie, Edward A.; and Dellario, Patrick J., 4,059,325, Cl. 339-94.00A.
Gilbert, Kendall E.; Johnson, Daniel; and Macier, Robert Raymond, 4,058,975, Cl. 60-39.28T.
Horvay, Julius B.; and Alvarez, Robert J., 4,058,989, Cl. 62-256.000.
Ouelette, Ronald J.; Canney, Robert S.; and Stetson, Ralph B., 4,059,326, Cl. 339-113.00R.
Tart, David K.; and Osteen, Mitchell M., 4,059,753, Cl. 362-267.000.
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Gent, Alan N.: *See—*
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Georg Fischer Aktiengesellschaft: *See—*
Guldener, Erich; and Trosch, Paul, 4,059,250, Cl. 251-304.000.
Geo. W. Boliman & Co., Inc.: *See—*
Heisey, Willis A., 4,059,516, Cl. 210-53.000.
Gerald Conway & Co., Inc.: *See—*
Conway, Gerald A., 4,059,190, Cl. 211-57.100.
Gerbault, Marcel; and Gair, Robert, to Sea Tank Co. S.A.; and Oceanic Contractors Inc. Method and device for connecting sub-marine pipelines to a weight platform. 4,058,987, Cl. 61-86.000.
Gergaud, Fernand, to International Business Machines Corporation. Switch structure having matrix arranged elongated undulated contact. 4,059,737, Cl. 200-5.00A.
Germain, Fernand. Energy storage and conversion technique and apparatus. 4,058,979, Cl. 60-327.000.
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Gerson, Samuel L.; and Jones, Frank W., to Fasline Food Equipment Co. Slicing device. 4,059,037, Cl. 83-407.000.
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Schmieder, Helmut; and Stieglitz, Ludwig, 4,059,671, Cl. 423-10.000.
Gibbons, Loren Kenneth, to FMC Corporation. 3-Alkoxyisothiazole derivatives as herbicides. 4,059,433, Cl. 71-90.000.
Gibson, Myron R., to Caterpillar Tractor Co. Rotary engine having low thermal conductivity rotor. 4,059,370, Cl. 418-56.000.
Gifford, Bruce M.: *See—*
Owen, Alfred B.; and Gifford, Bruce M., 4,059,215, Cl. 228-173.00C.
Gilbert, Kendall E.; Johnson, Daniel; and Macier, Robert Raymond, to General Electric Company. Gas turbine temperature sensor validation apparatus and method. 4,058,975, Cl. 60-39.28T.
Gipson, Robert Malone, to Texaco Development Corporation. Boride catalyst for epoxidizing olefinic compounds. 4,059,599, Cl. 260-348.290.
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Gladyshev, Jury Ivanovich: *See—*
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Glaser, Ralph P. Abdominal and hernia support. 4,059,103, Cl. 128-96.000.
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Robinson, Colin; and Walker, Derek, 4,059,573, Cl. 260-112.50R.
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Glory Kogyo Kabushiki Kaisha: *See—*
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Kinoshita, Yoshio, 4,059,122, Cl. 133-3.00D.
Nakai, Shiro; and Nakamura, Minoru, 4,058,955, Cl. 53-212.000.
Gloucester Engineering Co., Inc.: *See—*
Schott, Charles M., Jr., 4,059,381, Cl. 425-406.000.
Goetz, Richard W., to National Distillers and Chemical Corporation. Transalkylation of tertiary amines and alcohols, to produce ethylene glycol. 4,059,640, Cl. 260-635.00R.
Goldstein, Roger F.: *See—*
Strahorn, David F.; and Goldstein, Roger F., 4,059,517, Cl. 210-73.00R.
Golombeck, Paul; and Hertl, Friedrich, to Deutsche Gold- und Silber-Schneideanstalt vormals Roessler. Water free light silica and silicate fillers for cross-linking elastomers. 4,059,558, Cl. 260-42.330.
Goodwin, Robert J., to C. H. Heist Corporation. Lance tip construction. 4,058,870, Cl. 15-104.10R.
Goodyear Tire & Rubber Company, The: *See—*
Fielding-Russel, George Samuel; and Gent, Alan N., 4,059,254, Cl. 267-140.000.
Goossens, Walter; Hermann, Wolfgang; Keusch, Wilhelm; and Redlich, Rudolf, to Eschweiler Bergwerks-Verein Aktiengesellschaft. Method for producing fuel briquettes. 4,059,412, Cl. 44-10.00H.
Gorbaty, Martin L.: *See—*
Schlosberg, Richard H.; Gorbaty, Martin L.; and Lang, Robert J., 4,059,410, Cl. 44-1.00R.
Gosling, Alexander Bennett; Plummer, Dexter Robert; and Stanwell-Smith, Colin Howard, to Strathearn Audio Limited. Mechanical gearing. 4,059,030, Cl. 74-798.000.

Goto, Kuniaki; Asai, Harumi; and Natsuume, Tadao, to Nippon Zeon Co. Ltd. Novel phenol antioxidants. 4,059,563, Cl. 260-45.95H.
Grahl, Darwin R.; and Haramoto, Cary, to Parker-Hannifin Corporation. Tube coupling. 4,059,297, Cl. 285-340.000.
Gramlich, Fritz, deceased: *See*—
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Gramlich, Ute, legal representative: *See*—
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Granholm, Sven, to Linden-Alimak AB. Ground stabilizing agent feeding device. 4,058,986, Cl. 61-63.000.
Grantham, Frederick W. Laundry folder. 4,059,257, Cl. 270-66.000.
Grantham, Frederick W. Double fold automatic folding apparatus. 4,059,258, Cl. 270-67.000.
Grassl, Reinhold. Mechanical motion sensor. 4,059,066, Cl. 116-115.000.
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Kopke, Helmut; Ohlinger, Manfred; Grau, Werner; Schoenafinger, Eduard; and Schneehage, Hans Henning, 4,059,716, Cl. 428-403.000.
Greatbatch, Wilson; Mead, Ralph T.; McLean, Robert L.; Rudolph, Frank W.; and Frenz, Norbert W., to Eleanor & Wilson Greatbatch Foundation. Method of making a lithium-bromine cell. 4,058,889, Cl. 29-623.500.
Greaves, Cecil. Lock de-icer. 4,058,995, Cl. 70-431.000.
Green, Edmund T. Tire-chain device. 4,059,137, Cl. 152-232.000.
Green, John Henry; and Landry, Joseph Elide, to Bell Telephone Laboratories, Incorporated. Signaling storage in digital channel banks. 4,059,731, Cl. 179-15.0BY.
Green, Robin John; Johnson, Richard Shaw; and Potter, John Kenneth, to Lever Brothers Company. Method for preparing granulated detergent formulations. 4,059,538, Cl. 252-95.000.
Greene, Edward P. Burst/slip correction decoder and method. 4,059,825, Cl. 340-146.10D.
Greenfield, Irving E., Jr.; and Jacobson, Ronald C., to Food Systems, Inc. Meal-service powdered foods dispenser. 4,059,181, Cl. 194-13.000.
Greer, Tom R., to International Enterprises, Inc. Junk basket and method of removing foreign material from a well. 4,059,155, Cl. 166-301.000.
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Grella, Werner: *See*—
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Grisel, Byron Lynn, to Grizzley Ski Lock Corporation. Carrier and lock for ski equipment. 4,059,209, Cl. 224-45.00S.
Griswold, James L. Trench shoring assembly with lifting attachment. 4,058,983, Cl. 61-41.00A.
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Gross, Albert; Schaefer, Roland; and Reiss, Siegfried, to Kulzer & Co. GmbH. Bone cement compositions containing gentamycin. 4,059,684, Cl. 424-4.000.
Grosshandler, Sandor, to Dow Chemical Company, The. Cartridge filter. 4,059,528, Cl. 210-282.000.
Grossman, Harold, to Montclair Research Corporation. Cigarette and filter. 4,059,119, Cl. 131-9.000.
Grossmann, Dietrich: *See*—
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Grudzien, Christopher Peter: *See*—
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Grumman Aerospace Corporation: *See*—
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Knowles, Gregory W.; Sangesland, Odd E.; Vroom, Henry J.; and Madey, Robert W., 4,059,093, Cl. 126-271.000.
Levine, Howard S.; and Winter, Robert, 4,059,346, Cl. 350-295.000.
Grundmann, Edgard; Heitland, Herbert; and Kroll, Rudolf, to Volkswagenwerk Aktiengesellschaft. Device for utilizing the heat energy of solar radiation. 4,059,095, Cl. 126-271.000.
Gruniger, Emil, to IDC Chemie AG. Heating system with a thermal pump. 4,059,146, Cl. 165-45.000.
Grushko, July Sergeevich: *See*—
Alexandrov, Anatoly Julianovich; Grushko, July Sergeevich; Makarov, Evgeny Fredovich; Mishin, Konstantin Yakovlevich; and Baltrunas, Daljus Antanas Jono, 4,059,769, Cl. 250-493.000.
GTE Sylvania Incorporated: *See*—
Armstrong, Donald E.; Sindlinger, Ronald E.; Cohen, Bernard; Tozier, John E.; and Audesse, Emery G., 4,059,389, Cl. 431-95.00R.
Shaffer, John W., 4,059,388, Cl. 431-95.00R.
Guillermin, Rene; Joly, Jean; and Sangalli, Sylvio, to Rhone-Poulenc-Textile. Apparatus for treating filamentary products. 4,059,068, Cl. 118-420.000.
Guitoneau, Hans Edward: *See*—
Acda, Petrus Marinus; and Guitoneau, Hans Edward, 4,059,291, Cl. 285-197.000.
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Guldener, Erich; and Trosch, Paul, to Georg Fischer Aktiengesellschaft. Stop valve with a spherical stopcock. 4,059,250, Cl. 251-304.000.
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Gulf Research & Development Company: *See*—
Crissman, James H.; Fritsche, G. Ray; Hamel, Frederick B.; and Hilty, Lloyd W., 4,059,498, Cl. 204-188.000.
Gulitz, Louis; Kwap, Theodore William; Lisle, Walter Irving; O'Kane, Daniel Francis; and Poponiak, Michael Robert, to International Business Machines Corporation. Combustion monitoring and control system. 4,059,385, Cl. 431-12.000.
Gustafsson, Lars Ake Olof; and Ulin, Carl-Otto, to U.S. Philips Corporation. Mosaic printer. 4,059,182, Cl. 197-1.00R.
Gutman, Arnold D.: *See*—
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Habert, Roger J., to Ducellier & Cie. Method and apparatus for obtaining an automatic ignition advance in automobile internal combustion engine. 4,059,083, Cl. 123-146.50A.
Habrant, Yvon. Wallcovering. 4,058,946, Cl. 52-273.000.
Hachikubo, Kazumasa; and Suzuki, Shuzo, to Bio Research Center, Co., Ltd. Method of producing long-chain alpha-hydroxyalkanoic acids. 4,059,488, Cl. 195-28.00R.
Haemonetics Corporation: *See*—
Latham, Allen, Jr., 4,059,108, Cl. 128-214.00R.
Haga, Kyosuke, to Toyoda-Koki Kabushiki-Kaisha. Pulse distribution apparatus for linear interpolation in a numerical control system. 4,059,746, Cl. 364-107.000.
Hagen, Winston H. Monitor for biological volume changes. 4,059,169, Cl. 128-2.05V.
Haggard, Richard A.: *See*—
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Haigh, John M. Transfer dyeing of plastic surfaces which may be combined with lamination or molding procedures. 4,059,471, Cl. 156-244.000.
Hajos, Zoltan George, to Hoffmann-La Roche, Inc. Substituted indanones. 4,059,612, Cl. 260-456.00R.
Hake, Leon M., to Wittwer Construction Company. Backhoe-mounted shear. 4,058,915, Cl. 37-117.500.
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Hamisch, Paul H., Jr., to Monarch Marking Systems, Inc. Label printing and applying apparatus. 4,059,476, Cl. 156-384.000.
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Handa, Susumu; Tanaka, Yoshiaki; Nishibata, Atsushi; Ueda, Sadashi; Inamoto, Yoshiaki; Saito, Masahiro; Tanimoto, Fumio; and Kitano, Hisao, to Kao Soap Co., Ltd. Process for preparing isocyanic acid derivatives. 4,059,610, Cl. 544-193.000.
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Hannebaum, Manfred: *See*—
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Hanslik, Wilhelm, to Krauss-Maffei Austria Gesellschaft m.b.H. Scraper flight conveyor for conveying preheated thermoplastic bulk material to a screw extruder. 4,059,401, Cl. 432-132.000.
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Harder, Arthur J., Jr., to Coach and Car Equipment Corporation. Seat with removable seat cushion. 4,059,306, Cl. 297-452.000.
Harle, Hermann; and Eisenmann, Siegfried, to Furstlich Hohenzollernsche Huttenver Waltung Laucherthal. Method and apparatus for grinding the tooth flanks of internally-toothed gear wheels. 4,058,938, Cl. 51-287.000.
Harney, Robert C.; and Schipper, John F., to United States of America, Energy Research and Development Administration. Passive and active pulse stacking scheme for pulse shaping. 4,059,759, Cl. 250-206.000.
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Harrison, Michael, to Colgate Palmolive Company. Insolubilized salts of 1,6-di-p-(chlorophenyl biguanido) hexane. 4,059,624, Cl. 260-565.000.
Harrison, Robert J., to Texaco Inc. Self-operating chemical feeder for an oil well. 4,059,149, Cl. 166-64.000.
Hart, Alan M., to Dow Chemical Company, The. Process for producing refractory material. 4,059,391, Cl. 432-13.000.
Hartelius, Clifford C., Jr., to Sharp Kabushiki Kaisha. Integrated optical waveguide coupler. 4,059,338, Cl. 350-96.00C.
Hartley, John Edward, to T.I. (Group Services) Limited. Shearing hollow stock. 4,059,036, Cl. 83-188.000.
Hartley, Kenneth H. Skein dispenser. 4,059,243, Cl. 242-129.600.
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Hassan, Edward, to Raymond Lee Organization, Inc., The, a part interest. Snap-on screw. 4,059,041, Cl. 85-3.00S.
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Hausweiler, Arnold; Mayer, Adolf; and Bitners, Feliks, to Erdolchemie GmbH; and Bayer Aktiengesellschaft. Process for the purification of waste from acrylonitrile production. 4,059,492, Cl. 203-11.000.
Hay, Wayne W., to Airco, Inc. Calibrated anesthetic vaporizer. 4,059,657, Cl. 261-104.000.
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Hazenbosch, Edwin Hendrik; Van Rossen, Antoine Roberta; Beels, Roland Francois; and Aelterman, Marcel Frans, to AGFA-GEVAERT N.V. Processing of photographic silver halide material. 4,059,446, Cl. 96-50.00R.
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Heim Universal Corporation, The: *See*—
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Heisey, Willis A., to Geo. W. Bollman & Co., Inc. Process for treating wool scouring wastes. 4,059,516, Cl. 210-53.000.
Heiss, John Herbert, Jr.; and Schoen, Joel Mark, to Bell Telephone Laboratories, Incorporated. Method for selective encapsulation. 4,059,708, Cl. 427-96.000.
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Henson, Ralph B., to Caterpillar Tractor Co. Lubricating system and method for turbocharged engines. 4,058,981, Cl. 60-605.000.
Hercules Incorporated: *See*—
Mollere, John C., 4,059,819, Cl. 340-8.0LF.
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Mattimoe, Paul T.; Motter, Theodore J.; Hofmann, John J.; and Herliczek, Siegfried H., 4,059,469, Cl. 156-108.000.
Hermann, Wolfgang: *See*—
Goossens, Walter; Hermann, Wolfgang; Keusch, Wilhelm; and Redlich, Rudolf, 4,059,412, Cl. 44-10.00H.
Hershey, George P.: *See*—
Hershey, Virginia L.; and Hershey, George P., 4,058,927, Cl. 43-43.130.
Hershey, Virginia L.; and Hershey, George P., to Raymond Lee Organization, Inc., The. Snag-free hydrodynamic fishing sinker container. 4,058,927, Cl. 43-43.130.
Hertl, Friedrich: *See*—
Golombeck, Paul; and Hertl, Friedrich, 4,059,558, Cl. 260-42.330.
Heske, William Albert; and Grudzien, Christopher Peter, to Dresser Industries, Inc. Digital pressure standard. 4,059,128, Cl. 137-487.500.
Hewlett-Packard Company: *See*—
Dickinson, Peter D.; Osborne, Thomas E.; Rode, France; and Baum, Allen J., 4,059,750, Cl. 364-715.000.
Pierce, Perry H.; and Prendergast, Dan L., 4,058,890, Cl. 29-625.000.
Toomay, Timothy L., 4,059,213, Cl. 226-151.000.
Heyl, Robert D., to Young Industries, Inc., The. Rotary valve. 4,059,205, Cl. 222-368.000.
Hi-Life Rubber Co., Inc.: *See*—
Siddall, Don F.; and Hoffman, Vincent L., 4,059,070, Cl. 119-14.470.
Higashi, Fukuji: *See*—
Yamazaki, Noboru; and Higashi, Fukuji, 4,059,603, Cl. 260-408.000.
Higgins, James Francis, to Du Pont de Nemours, E. I., and Company. Lead chromate pigment with improved thermal stability. 4,059,459, Cl. 106-298.000.
Hild, Erich: *See*—
Schulz, Horst; Flosser, Josef; Kessler, Reinhard; Schmidt, Karl-Heinz; Eisend, Ewald; Hild, Erich; Loffler, Karl-Heinz; and Steuer, Werner, 4,059,028, Cl. 74-781.00B.
Hildebrandt, Nieczyslaw: *See*—
Nicolas, Jean; Lagrange, Alain; and Hildebrandt, Nieczyslaw, 4,059,664, Cl. 264-66.000.
Hill, Edward J. Valved stopper for a urine bottle. 4,059,124, Cl. 137-38.000.
Hilterhaus, Karl Heinz, to Chemie-Anlagenbau Bischofsheim GmbH; and Reuter Technologie GmbH. Process for producing finished and/or irreversibly embossed microporous sheet structures. 4,059,659, Cl. 264-45.300.
Hilty, Lloyd W.: *See*—
Crissman, James H.; Fritsche, G. Ray; Hamel, Frederick B.; and Hilty, Lloyd W., 4,059,498, Cl. 204-188.000.
Himics, Richard Joseph: *See*—
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Hinz, Jurgen: *See*—
Elfert, Klaus; Hinz, Jurgen; and Binsack, Rudolf, 4,059,580, Cl. 544-73.000.
Hiragaki, Shigeho: *See*—
Mochizuki, Koichi; and Hiragaki, Shigeho, 4,059,523, Cl. 210-198.00C.
Hirasawa, Kunio: *See*—
Yoshioka, Yoshio; Hirasawa, Kunio; and Tsukushi, Masanori, 4,059,741, Cl. 200-148.00A.
Hirata, Noritsugu: *See*—
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Hirayama, Kazuhiro: *See*—
Kitamura, Takashi; Watanabe, Asao; Nakano, Takashi; Masaki, Katsumi; Hirayama, Kazuhiro; Sato, Yasushi; and Tokiwa, Taisuke, 4,059,833, Cl. 346-108.000.
Hirohata, Hyogo: *See*—
Oita, Masahiro; Hirohata, Hyogo; and Hamasaki, Nobuhiro, 4,059,451, Cl. 106-1.260.
Hirokane, Tadashi: *See*—
Yanagida, Kiyomi; Hirokane, Tadashi; Tsukiyasu, Tadashi; and Sato, Tomoari, 4,059,494, Cl. 204-28.000.
Hirosaki, Kanari; and Hirosaki, Shin, to Hirosaki, Kanari. Method for manufacturing a tonic composition for man and other animals. 4,059,695, Cl. 424-195.000.
Hirosaki, Shin: *See*—
Hirosaki, Kanari; and Hirosaki, Shin, 4,059,695, Cl. 424-195.000.
Hirose, Huminori, to Matsushita Electric Industrial Co., Ltd. Magnetic recording-reproducing device. 4,059,245, Cl. 242-201.000.
Hirose, Yoshio: *See*—
Nakamura, Junji; Miyashiro, Shigeyoshi; Hirose, Yoshio; and Awao, Takeyoshi, 4,059,572, Cl. 260-112.00R.
Hitachi, Ltd.: *See*—
Nakaizumi, Yasushi; Ueno, Yukichi; and Okumura, Masahide, 4,059,783, Cl. 315-107.000.
Sakamoto, Yoshio; and Yamamura, Masahiro, 4,059,808, Cl. 330-257.000.
Suzuki, Kensuke; Sasaki, Takeshi; and Matsuzaki, Mitsuyuki, 4,059,837, Cl. 357-73.000.
Tanigami, Takahiko; Hasegawa, Akira; and Horikoshi, Shigeru, 4,059,087, Cl. 123-196.00S.
Tsubouchi, Haruyoshi, 4,059,086, Cl. 123-196.00R.
Yoshioka, Yoshio; Hirasawa, Kunio; and Tsukushi, Masanori, 4,059,741, Cl. 200-148.00A.
Hittmair, Paul: *See*—
Burkhardt, Jurgen; Hittmair, Paul; and Wegehaupt, Karl-Heinrich, 4,059,559, Cl. 260-448.20E.
Hitzler, Otto; Pennewiss, Horst; Froelich, August; Markert, Gerhard; and Wunderlich, Winfried, to Rohm GmbH. Symmetric azo-bis-mercapto compounds. 4,059,574, Cl. 260-192.000.
Hobbs, Robert N.: *See*—
Lovely, John W.; and Hobbs, Robert N., 4,058,934, Cl. 51-5.00D.
Hoch, Samuel; Ceprini, Mario Q.; and Szabo, Emery, to Tenneco Chemicals, Inc. Liquid stabilizer systems and vinyl halide resin compositions containing same. 4,059,562, Cl. 260-45.75S.
Hochreiter, William Thomas; Craig, Loren Jackson; and Mindler, Fredric A., to Eastman Kodak Company. Exposure control mechanism. 4,059,836, Cl. 354-29.000.
Hochreuter, Richard, to Sandoz Ltd. Polychlorohydrin ethers of tris-(hydroxymethyl)-aminomethane. 4,059,631, Cl. 260-584.00B.
Hochstrasser, Harry T., to Becton, Dickinson and Company. Disposable chemical indicators. 4,059,407, Cl. 23-253.0TP.
Hoechst Aktiengesellschaft: *See*—
Gernhardt, Wolfram; Meier-Maletz, Gerhard; and Zeutschel, Heinz, 4,059,475, Cl. 156-379.000.
Kolbe, Andreas; and Dinter, Peter, 4,059,497, Cl. 204-165.000.
Muller, Heinz, 4,059,438, Cl. 75-81.000.
Hoffman, Charles Reeves, to International Business Machines Corporation. Integrated circuit amplifier. 4,059,811, Cl. 330-277.000.
Hoffman, Louis S. Apparatus for bonding layers of resinous material. 4,059,478, Cl. 156-510.000.
Hoffman, Vincent L.: *See*—
Siddall, Don F.; and Hoffman, Vincent L., 4,059,070, Cl. 119-14.470.
Hoffmann-La Roche, Inc.: *See*—
Chodnekar, Madhukar Subraya; Pfiffner, Albert; Rigassi, Norbert; Schwieter, Ulrich; and Suchy, Milos, 4,059,600, Cl. 260-348.460.
Hajos, Zoltan George, 4,059,612, Cl. 260-456.00R.
Holland, George William; Jernow, Jane Liu; and Rosen, Perry, 4,059,576, Cl. 542-426.000.
Kienzle, Frank; and Rosen, Perry, 4,059,577, Cl. 542-426.000.
Hofmann, John J.: *See*—
Mattimoe, Paul T.; Motter, Theodore J.; Hofmann, John J.; and Herliczek, Siegfried H., 4,059,469, Cl. 156-108.000.
Hohban, Kenneth J.: *See*—
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Hokushin Electric Works, Ltd.: *See*—
Torimaru, Takashi, 4,059,014, Cl. 73-194.0EM.
Uchino, Hisanori; Takada, Masamichi; Shimizu, Takahiro; Shibayama, Masamitsu; and Furuno, Fumiya, 4,059,196, Cl. 214-138.00R.
Holland, Charles M.; and Parrack, Lawrence W., to Misto-Gen Equipment Co. Two-step injection molding. 4,059,384, Cl. 425-577.000.
Holland, George William; Jernow, Jane Liu; and Rosen, Perry, to Hoffmann-La Roche, Inc. 11-Substituted prostaglandins. 4,059,576, Cl. 542-426.000.
Holliday, Robin David; and Milne, David John, to Comalco Limited. Production of bauxite and aluminium chloride of low iron content. 4,059,673, Cl. 423-136.000.
Hollingsworth, Leon W., to Pioneer Motor Bearing Co. Hydrostatically supported tilting pad journal bearing improvements. 4,059,318, Cl. 308-73.000.
Hollweck, Walter; Schnee, Wilhelm; Eberl, Karlheinz; and Basel, Werner. Temperature sensitive switch with separate bimetal and heat transfer means. 4,059,817, Cl. 337-365.000.
Holshouser, Howard E.: *See*—
Banker, Robert O.; and Holshouser, Howard E., 4,059,838, Cl. 358-27.000.
Holtz, Hans D.; and Bonazza, Benedict R., to Phillips Petroleum Company. Ashless fuel detergent additives. 4,059,414, Cl. 44-58.000.
Holtz, Hans D.: *See*—
De Vault, Albert N.; and Holtz, Hans D., 4,059,535, Cl. 252-33.000.
Homeyer, Bernhard: *See*—
Maurer, Fritz; Riebel, Hans-Jochem; Hammann, Ingeborg; Behrenz, Wolfgang; and Homeyer, Bernhard, 4,059,696, Cl. 424-200.000.
Honeywell Inc.: *See*—
Wilwerding, Dennis J., 4,059,756, Cl. 250-201.000.
Wilwerding, Dennis J., 4,059,757, Cl. 250-201.000.
Wilwerding, Dennis J., 4,059,758, Cl. 250-201.000.
Hood, Frederick E.; Mitchell, Donald K.; and Uhring, Gary S., to Hood Sailmakers, Inc. Roll-furling mainsail. 4,059,063, Cl. 114-106.000.
Hood Sailmakers, Inc.: *See*—
Hood, Frederick E.; Mitchell, Donald K.; and Uhring, Gary S., 4,059,063, Cl. 114-106.000.
Hooker Chemicals & Plastics Corporation: *See*—
Weil, Edward D., 4,059,615, Cl. 560-132.000.
Hooper, Gene R.: *See*—
Berryman, Angus L.; Hooper, Gene R.; and Hague, Richard E., 4,059,056, Cl. 105-368.00R.
Hooper, Inc.: *See*—
Sanborn, Philip A., Jr.; Westbrook, Shelby F.; and Sullivan, Donald A., 4,058,953, Cl. 53-22.00A.
Hopkins, Harold Horace. Microscope and magnification changer. 4,059,336, Cl. 350-55.000.
Hori, Kikuo; Horiuchi, Takumi; Nishikawa, Mikio; Ryugo, Shiro; Ishizuka, Akira; and Takenaka, Yoshisuke, to Teijin Limited. Method and apparatus for winding a thread on a bobbin at a high winding speed. 4,059,239, Cl. 242-18.100.
Hori, Kikuo: *See*—
Iimuro, Hiroyuki; Horiuchi, Takumi; Kuroda, Yoji; Hori, Kikuo; and Kawano, Tatumi, 4,058,967, Cl. 57-140.00J.
Horikoshi, Shigeru: *See*—
Tanigami, Takahiko; Hasegawa, Akira; and Horikoshi, Shigeru, 4,059,087, Cl. 123-196.00S.
Horiuchi, Takumi: *See*—
Hori, Kikuo; Horiuchi, Takumi; Nishikawa, Mikio; Ryugo, Shiro; Ishizuka, Akira; and Takenaka, Yoshisuke, 4,059,239, Cl. 242-18.100.
Iimuro, Hiroyuki; Horiuchi, Takumi; Kuroda, Yoji; Hori, Kikuo; and Kawano, Tatumi, 4,058,967, Cl. 57-140.00J.
Hornung, Ewald, to Feinwerkbau Helfer & Co. KG. Screw-driving devices. 4,059,034, Cl. 81-57.370.
Horrall, Thomas R.: *See*—
Watters, Bill G.; Nacey, Michael; and Horrall, Thomas R., 4,059,726, Cl. 179-1.50M.
Horrocks, Donald L., to Beckman Instruments, Inc. Method and apparatus for determining accuracy of radiation measurements made in the presence of background radiation. 4,059,762, Cl. 250-336.000.
Horsfall, Harry: *See*—
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Hortman, Norman G.: *See*—
Nix, George J.; Barrington, Burchus Q.; Farley, David L.; and Hortman, Norman G., 4,059,153, Cl. 166-264.000.
Horvay, Julius B.; and Alvarez, Robert J., to General Electric Company. Refrigerator including air wall separating the freezer and fresh food portions. 4,058,989, Cl. 62-256.000.
Hosaka, Hirokazu; Tanimoto, Kenji; Okabe, Hiromichi; Tanaka, Kunthiko; Ueda, Yuji; and Dohgane, Iwao, to Sumitomo Chemical Company, Limited. Method for extraction of dihydroperoxide. 4,059,637, Cl. 260-610.00A.
Hoshi, Akira: *See*—
Yoshida, Toshio; Terai, Kiyoshi; Matsui, Shigetomo; Kinoshita, Tsuneo; Hoshi, Akira; and Tohmoto, Toru, 4,058,883, Cl. 29-448.000.
Hoskins, Phillip Keith, to International Business Machines Corporation. Dot matrix printer with slanted print head and modular skewing of dot pattern information. 4,059,183, Cl. 197-1.00R.
Hosokoshi, Kakuichiro; Yamamoto, Hikoshi; Tanaka, Masayuki; and Omura, Shinichi, to Matsushita Electronics Corporation. Light exposing apparatus for forming a phosphor screen of a cathode ray tube. 4,059,834, Cl. 354-1.000.
House, Herbert Douglas. Runner attachment for bicycles with a reaction thrust device. 4,059,168, Cl. 180-1.00P.
Hughes Aircraft Company: *See*—
Epperson, Ronald D., 4,058,971, Cl. 58-39.500.
Hughes, Bernard J. Protective system. 4,059,059, Cl. 109-1.00R.
Hughey, Emerson Dee. Propeller making apparatus and method. 4,058,880, Cl. 29-156.80P.
Humboldt Holdings, Inc.: *See*—
Shaw, William Stuart, 4,059,090, Cl. 126-121.000.

Humboldt Products Corporation: *See—*
DePriest, Donald R.; Brandon, Bobby C.; and Buie, Connell M., 4,059,104, Cl. 128-132.00D.
Hunter, Edwin J., to Toro Company, The. Moisture sensing apparatus and method. 4,059,227, Cl. 239-1.000.
Huntley, Orville P. Auxiliary portable lock. 4,059,299, Cl. 292-294.000.
Huppi, Xaver Johann: *See—*
Frauenfelder, Alfred; and Huppi, Xaver Johann, 4,059,420, Cl. 55-112.000.
Hurst, Forrest G.: *See—*
Moss, Robert J.; and Hurst, Forrest G., 4,058,959, Cl. 56-295.000.
Hutton, James L. Intrusion barrier and guide for sliding windows, doors and the like. 4,059,141, Cl. 160-90.000.
Huzyak, Paul. Agitator for melting furnace. 4,059,251, Cl. 266-235.000.
HydroTech International, Inc.: *See—*
Mohr, Harvey O., 4,059,288, Cl. 285-2.000.
Ibsen Nielsen, Hans Jorgen; and Hansen, Elo Harald, to Bifok AB. Nitrate ion selective electrode. 4,059,499, Cl. 204-195.00M.
Ichigo, Minoru: *See—*
Tohyama, Masao; Ichigo, Minoru; Suzuki, Takeshi; Nakasu, Makoto; Ando, Akinobu; Yoshida, Akitoshi; Kosaka, Masaharu; Hayasi, Norihisa; and Inoue, Shigeki, 4,059,553, Cl. 260-29.60S.
Ichimi, Hideo. Joint for connection of gas cock to metal pipe. 4,059,290, Cl. 285-169.000.
Ichinose, Matzuo, to Kabushiki Kaisha Suwa Seikosha. Digital display electronic timepiece. 4,058,970, Cl. 58-23.00R.
ICI Australia Limited: *See—*
Baklien, Asbjorn; and Kolm, Jan, 4,059,588, Cl. 260-306.70T.
IDC Chemie AG: *See—*
Gruniger, Emil, 4,059,146, Cl. 165-45.000.
Ide, Homare. Shield wire. 4,059,724, Cl. 174-36.000.
Iida, Hiroshi, to Manno Kogyo Company, Limited. Spare tire carrier. 4,059,197, Cl. 214-451.000.
Iimuro, Hiroyuki; Horiuchi, Takumi; Kuroda, Yoji; Hori, Kikuo; and Kawano, Tatumi, to Teijin Limited. Textured polyester multifilament yarn. 4,058,967, Cl. 57-140.00J.
Ikeda, Kaoru: *See—*
Takematsu, Tetsuo; Konnai, Makoto; Takeda, Makoto; Fuga, Nobuhiko; Ikeda, Kaoru; and Shugaya, Kiyoshi, 4,059,431, Cl. 71-87.000.
Takematsu, Tetsuo; Konnai, Makoto; Takeda, Makoto; Fuga, Nobuhiko; Ikeda, Kaoru; and Shugaya, Kiyoshi, 4,059,432, Cl. 71-87.000.
Ilin, Vadim Sergeevich: *See—*
Movshovich, Pavel Mikhailovich; Khavkin, Viktor Pavlovich; Maximov, Gennady Konstantinovich; Babushkina, Natalya Borisovna; Baranov, Alexandr Anatolievich; Ivanov, Lev Nikolaevich; Nezelenov, Sergei Vladimirovich; Shutov, Gennady Nikolaevich; Tsygulev, Leonid Nikiforovich; and Ilin, Vadim Sergeevich, 4,058,960, Cl. 57-34.0AT.
Illig, Edwin J.: *See—*
Brydges, William T., III; and Illig, Edwin J., 4,059,425, Cl. 65-22.000.
Illinois Tool Works Inc.: *See—*
Morland, Richard Harlon, 4,058,864, Cl. 10-2.000.
Ilmaier, Bernard; and Zeiringer, Hans, to Treibacher Chemische Werke Aktiengesellschaft. Method for producing alumina and alumina-zirconia abrasive material. 4,059,417, Cl. 51-309.00A.
Ilsemann, Bernhard: *See—*
Otto, Heinz; and Ilsemann, Bernhard, 4,059,286, Cl. 280-673.000.
Imai, Hirosuke; and Ito, Hiroyuki, to Nippon Oil Company Ltd. Novel aqueous adhesive. 4,059,555, Cl. 260-29.70H.
Imanari, Makoto: *See—*
Yamaguchi, Yoshinobu; Kitano, Nanahiko; Watanabe, Yoshihisa; and Imanari, Makoto, 4,059,544, Cl. 252-471.000.
Imperial Arts Corporation: *See—*
Schneider, Irwin, 4,059,096, Cl. 126-375.000.
Imperial Chemical Industries Limited: *See—*
Bentley, John; and Thompson, Morice William, 4,059,557, Cl. 260-31.20N.
Burrell, Raymond Alexander; and Cox, John Michael, 4,059,703, Cl. 424-269.000.
Jennings, James Robert; and Kelly, Lawrence Francis Michael, 4,059,542, Cl. 252-431.00P.
Le Count, David James; and Squire, Christopher John, 4,059,622, Cl. 260-559.00A.
Meers, John Laurence, 4,059,489, Cl. 195-31.00F.
Speakman, Derek Norman Alfred, 4,059,547, Cl. 260-17.00R.
Walsingham, Richard Warren; and Stuart, Ronald Sangster, 4,059,606, Cl. 260-448.20B.
In Situ Technology, Inc.: *See—*
Terry, Ruel C., 4,059,151, Cl. 166-258.000.
Inagaki, Kenji: *See—*
Iriguchi, Norio; Kuroda, Toru; Kominami, Naoya; and Inagaki, Kenji, 4,059,107, Cl. 128-173.00H.
Inamoto, Yoshiaki; Fujikura, Yoshiaki; Tsuchihashi, Kiyoshi; and Kashihara, Eiji, to Kao Soap Co., Ltd. Process for hydride transfer reduction rearrangement of 8-exo-hydroxymethyl-endo-tricyclo 5.2.1.$0^{2,6}$] decane to form tricyclo[5.3.1.$0^{3,8}$] undecane. 4,059,643, Cl. 260-666.0PY.
Inamoto, Yoshiaki: *See—*
Handa, Susumu; Tanaka, Yoshiaki; Nishibata, Atsushi; Ueda, Sadashi; Inamoto, Yoshiaki; Saito, Masahiro; Tanimoto, Fumio; and Kitano, Hisao, 4,059,610, Cl. 544-193.000.
Ing. C. Olivetti & C., S.p.A.: *See—*
Cosmo, Nicola, 4,059,259, Cl. 271-3.000.
Violino, Ettore, 4,059,748, Cl. 235-303.100.
Ingersoll-Rand Company: *See—*
McGahan, Wallace A.; Webb, Paul D.; and Morse, Henry W., 4,059,368, Cl. 417-243.000.
Inoue, Shigeki: *See—*
Tohyama, Masao; Ichigo, Minoru; Suzuki, Takeshi; Nakasu, Makoto; Ando, Akinobu; Yoshida, Akitoshi; Kosaka, Masaharu; Hayasi, Norihisa; and Inoue, Shigeki, 4,059,553, Cl. 260-29.60S.
Institut de Recherches de la Siderurgie Francaise (IRSID): *See—*
Alberny, Robert; Birat, Jean Pierre; and Ventavoli, Roger, 4,059,142, Cl. 164-49.000.
Institut Francais du Petrole: *See—*
Lallement, Jacques; Parc, Guy; and de Gaudemaris, Gabriel, 4,059,536, Cl. 252-33.300.
International Business Machines Corporation: *See—*
Babuka, Robert; and Harris, John Bernard, 4,059,323, Cl. 339-75.00M.
Dewitt, David, 4,058,887, Cl. 29-571.000.
Folberth, Otto G., 4,059,814, Cl. 333-29.000.
Gergaud, Fernand, 4,059,737, Cl. 200-5.00A.
Gulitz, Louis; Kwap, Theodore William; Lisle, Walter Irving; O'Kane, Daniel Francis; and Poponiak, Michael Robert, 4,059,385, Cl. 431-12.000.
Hoffman, Charles Reeves, 4,059,811, Cl. 330-277.000.
Hoskins, Phillip Keith, 4,059,183, Cl. 197-1.00R.
Jones, Gardner Duiany, Jr., 4,059,800, Cl. 325-38.00B.
Redding, Robert Caldwell; and Vaughan, Joe Larry, 4,059,184, Cl. 197-18.000.
Ruh, Wolf-Dieter; and Trippel, Gerhard, 4,059,480, Cl. 156-644.000.
International Enterprises, Inc.: *See—*
Greer, Tom R., 4,059,155, Cl. 166-301.000.
International Telephone and Telegraph Corporation: *See—*
Elderton, Peter P., 4,059,744, Cl. 235-92.0FL.
Invicta Plastics Limited: *See—*
Kindred, Michael, 4,059,273, Cl. 273-130.00R.
Iodinamics Corporation: *See—*
Polley, Richard D.; Nilson, Eric L.; Constantakis, Roberto; and Pruitt, Donovan E., 4,059,522, Cl. 210-198.00R.
Iriguchi, Norio; Kuroda, Toru; Kominami, Naoya; and Inagaki, Kenji, to Asahi Kasei Kogyo Kabushiki Kaisha. Two step type pressurized injector. 4,059,107, Cl. 128-173.00H.
Isaacson, Milton S.: *See—*
Smilg, Benjamin; and Isaacson, Milton S., 4,058,935, Cl. 51-163.100.
Ishida, Takashi. Internal grinder. 4,058,933, Cl. 51-5.00D.
Ishikawajima-Harima Jukogyo Kabushiki Kaisha: *See—*
Kobayashi, Toshihiro, 4,059,393, Cl. 432-58.000.
Ishimoto, Sachio: *See—*
Tomibe, Katsuhiko; Masuho, Yasuhiko; Matsuzawa, Kimihiko; Ishimoto, Sachio; Satake, Kazuo; and Watanabe, Tsuneo, 4,059,571, Cl. 260-112.00B.
Ishizuka, Akira: *See—*
Hori, Kikuo; Horiuchi, Takumi; Nishikawa, Mikio; Ryugo, Shiro; Ishizuka, Akira; and Takenaka, Yoshisuke, 4,059,239, Cl. 242-18.100.
Israel, Hans-Peter: *See—*
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Isshiki, Tomiya: *See—*
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Ito, Hideo: *See—*
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Ito, Hiroyuki: *See—*
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Ito, Yasuro; Kaga, Hideharu; Yamamoto, Yasuhiro; and Sumita, Tadayuki, to Ito, Yasuro; and Taisei Corporation. Apparatus for moulding hydraulic cement or the like material. 4,059,376, Cl. 425-546.000.
ITW Fastex Italia, S.p.A.: *See—*
Aimar, Michele, 4,059,200, Cl. 220-233.000.
Ivanov, Lev Nikolaevich: *See—*
Movshovich, Pavel Mikhailovich; Khavkin, Viktor Pavlovich; Maximov, Gennady Konstantinovich; Babushkina, Natalya Borisovna; Baranov, Alexandr Anatolievich; Ivanov, Lev Nikolaevich; Nezelenov, Sergei Vladimirovich; Shutov, Gennady Nikolaevich; Tsygulev, Leonid Nikiforovich; and Ilin, Vadim Sergeevich, 4,058,960, Cl. 57-34.0AT.
Ivey, John Saxon; and Braybrook, Kenneth Albert, to Borg-Warner Corporation. Sheet metal hub assembly. 4,059,365, Cl. 416-174.000.
Iwasa, Susumu; and Yoshida, Isamu, to Takeda Chemical Industries, Ltd. Diluents for rubella virus hemagglutination-inhibition test. 4,059,491, Cl. 195-103.50A.
Iwata Air Compressor Mfg. Co., Ltd.: *See—*
Arai, Kazuo, 4,059,358, Cl. 401-219.000.
Iwata, Kohshi: *See—*
Nishiyama, Keizo; Maeda, Sadao; and Iwata, Kohshi, 4,059,710, Cl. 427-307.000.
J. Bobst et Fils S.A.: *See—*
Primavesi, Otto Hubert Jan; and Primavesi, Alexander, deceased, 4,059,470, Cl. 156-238.000.
J. L. Clark Manufacturing Co.: *See—*
Foster, John A., 4,059,201, Cl. 220-258.000.
J. M. Voith GmbH: *See—*
Maier, Rudolf, 4,059,373, Cl. 425-192.00R.

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Spanel, Abram N.; Eiland, P. Frank; and Jacobs, David R., 4,059,021, Cl. 74-89.200.
Jacobs, Marcellus L.; and Jacobs, Paul R. Wind electric plant with improved alternator field excitation. 4,059,771, Cl. 290-44.000.
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Jacobson, Ronald C.: *See*—
Greenfield, Irving E., Jr.; and Jacobson, Ronald C., 4,059,181, Cl. 194-13.000.
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James, Lewis C., to Cities Service Research and Development Company. Catalyst withdrawal. 4,059,502, Cl. 208-152.000.
Janner, John R., Jr.: *See*—
Scholl, Charles H.; Janner, John R., Jr.; Stumphauzer, William C.; and Shuster, Duane O., 4,059,466, Cl. 156-78.000.
Scholl, Charles H.; Janner, John R., Jr.; and Stumphauzer, William C., 4,059,714, Cl. 428-310.000.
Japan Atomic Energy Research Institute: *See*—
Tatsuta, Hatsumi; and Kumazawa, Shigeru, 4,059,765, Cl. 250-367.000.
Japan Spectroscopic Co., Ltd.: *See*—
Mochizuki, Koichi; and Hiragaki, Shigeho, 4,059,523, Cl. 210-198.00C.
Jean Walterscheid GmbH: *See*—
von Allworden, Wilhelm, 4,058,990, Cl. 64-1.00S.
Jennings, James Robert; and Kelly, Lawrence Francis Michael, to Imperial Chemical Industries Limited. Organo-phosphorous catalyst composition and process for making the same. 4,059,542, Cl. 252-431.00P.
Jernigan, Marvin E., to Narco Scientific Industries, Inc. Objective plotting of visual fields by eye movement monitoring. 4,059,348, Cl. 351-30.000.
Jernow, Jane Liu: *See*—
Holland, George William; Jernow, Jane Liu; and Rosen, Perry, 4,059,576, Cl. 542-426.000.
Jobson, Peter Meredith: *See*—
Jones, Michael Lloyd; and Jobson, Peter Meredith, 4,059,786, Cl. 318-17.000.
Johannessen, Paul R.; and Ver Planck, Peter. Apparatus for degrading Q in a high-Q RF pulse transmitting system and the like. 4,059,801, Cl. 325-167.000.
John, Ronald, to Vacu-Blast Limited. Classification of particles. 4,059,189, Cl. 209-112.000.
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Robinson, Cecil H., 4,059,630, Cl. 260-586.00E.
Johns-Manville Corporation: *See*—
Earle, Paul Lewis; and Snider, George William, 4,058,947, Cl. 52-396.000.
Johnson, Daniel: *See*—
Gilbert, Kendall E.; Johnson, Daniel; and Macier, Robert Raymond, 4,058,975, Cl. 60-39.28T.
Johnson, Dennis G. Oil cap remover. 4,059,033, Cl. 81-3.10B.
Johnson, Fred Lowery, Jr., to Texaco Development Corporation. Process for preparing olefin sulfonates. 4,059,620, Cl. 260-513.00T.
Johnson, Lavell R., to Summa Corporation. Immobilized immunoadsorbent. 4,059,685, Cl. 424-12.000.
Johnson, Richard Shaw: *See*—
Green, Robin John; Johnson, Richard Shaw; and Potter, John Kenneth, 4,059,538, Cl. 252-95.000.
Johnson, Wayne O., to Rohm and Haas Company. Herbicidal 4-trifluoromethyl-3-cyanoalkoxy-4-nitro diphenyl ethers. 4,059,435, Cl. 71-105.000.
Jolliffe, James D.; and Sessions, Allen D. Cleat anchor for flexible vehicle track. 4,059,315, Cl. 305-35.0EB.
Joly, Jean: *See*—
Guillermin, Rene; Joly, Jean; and Sangalli, Sylvio, 4,059,068, Cl. 118-420.000.
Jones, Frank W.: *See*—
Gerson, Samuel L.; and Jones, Frank W., 4,059,037, Cl. 83-407.000.
Jones, Gardner Dulany, Jr., to International Business Machines Corporation. Digital multi-line companded delta modulator. 4,059,800, Cl. 325-38.00B.
Jones, Ivor Wynn: *See*—
Miles, Lyndon James; and Jones, Ivor Wynn, 4,059,663, Cl. 264-65.000.
Jones, John P., Jr., to Mobil Oil Corporation. Cover plate having adjustable latch means. 4,059,202, Cl. 220-325.000.
Jones, Michael Lloyd; and Jobson, Peter Meredith, to Possum Controls Limited. Wheelchair control circuit. 4,059,786, Cl. 318-17.000.
Jones, Raymond Henry: *See*—
Mathison, Ian William; Solomons, William Ebenezer; and Jones, Raymond Henry, 4,059,586, Cl. 260-287.00D.
Jones, Vercoe C., to S I Handling Systems, Inc. Driverless vehicle traffic control system. 4,059,053, Cl. 104-35.000.
Jonner, Wolf-Dieter, to Teldix GmbH. Anti-locking control system. 4,059,312, Cl. 303-92.000.
Judzis, Arnis; and Bond, Thomas J., to Standard Oil Company, The. Deep-draw thermoforming of thermoplastic sheet. 4,059,380, Cl. 425-298.000.
Jumashev, Georgy Stepanovich; and Furman, Motel Khaimovich. Surgical instrument for operation of anterior fenestrated spondylodessis in vertebral osteochondrosis. 4,059,115, Cl. 128-317.000.
Jundt, Werner, to Robert Bosch G.m.b.H. Ignition system for internal combustion engines using an ignition coil. 4,059,084, Cl. 123-148.00E.
Jurgens, Hans-Hermann: *See*—
Lipp, Eberhard; and Jurgens, Hans-Hermann, 4,058,907, Cl. 34-61.000.
Kabushiki Kaisha Kawai Gakki Seisakusho: *See*—
Obayashi, Nobuharu; Hashizume, Hikaru; Sakashita, Noriji; Kameyama, Seiji; Ezawa, Sadaaki; Kugisawa, Toshio; Washiyama, Yutaka; Kondo, Tatsunori; and Watanabe, Hironori, 4,059,040, Cl. 84-1.030.
Kabushiki Kaisha Maeda Shell Service: *See*—
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Kabushiki Kaisha Nakamura Seisakusho: *See*—
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Kabushiki Kaisha Suwa Seikosha: *See*—
Ichinose, Matzuo, 4,058,970, Cl. 58-23.00R.
Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: *See*—
Nishiyama, Keizo; Maeda, Sadao; and Iwata, Kohshi, 4,059,710, Cl. 427-307.000.
Kadin, Saul Bernard, to Pfizer. 2-Acylamino-3-[3-(dialkylamino)-propyl]imidazo[4,5-b]pyridines. 4,059,584, Cl. 260-268.0BC.
Kaga, Hideharu: *See*—
Ito, Yasuro; Kaga, Hideharu; Yamamoto, Yasuhiro; and Sumita, Tadayuki, 4,059,376, Cl. 425-546.000.
Kahlert, George; Pommer, Lawrence; Davis, John; and Whebell, Bert, to Northwood Pulp and Timber Limited. Waste burner overfire draft system. 4,059,061, Cl. 110-7.00A.
Kahn, Frederic Jay; and Taylor, Gary Newton, to Bell Telephone Laboratories, Incorporated. Doped liquid crystal display device. 4,059,340, Cl. 350-160.0LC.
Kakihana, Hidetake; and Miyamatsu, Tokuhisa, to Mitsubishi Rayon Co., Ltd. Method for separation and enrichment of isotopes. 4,059,670, Cl. 423-7.000.
Kamarian, Georgy Mikirtychevich. Electrode unit. 4,059,500, Cl. 204-288.000.
Kameyama, Seiji: *See*—
Obayashi, Nobuharu; Hashizume, Hikaru; Sakashita, Noriji; Kameyama, Seiji; Ezawa, Sadaaki; Kugisawa, Toshio; Washiyama, Yutaka; Kondo, Tatsunori; and Watanabe, Hironori, 4,059,040, Cl. 84-1.030.
Kamiyama, Shinichi: *See*—
Ariyama, Kenzo; Mano, Hiroshi; and Kamiyama, Shinichi, 4,059,394, Cl. 432-59.000.
Kankaanpaa, Matti; Nylund, Ragnar; and Reijonen, Yrjo, to Valmet Oy. Paper machine pickup and crepe-setting press section. 4,059,482, Cl. 162-281.000.
Kanro Co. Ltd.: *See*—
Yamazaki, Tatsuo; Hayashida, Takemi; and Sakuma, Masatoshi, 4,059,046, Cl. 99-355.000.
Kao Soap Co., Ltd.: *See*—
Handa, Susumu; Tanaka, Yoshiaki; Nishibata, Atsushi; Ueda, Sadashi; Inamoto, Yoshiaki; Saito, Masahiro; Tanimoto, Fumio; and Kitano, Hisao, 4,059,610, Cl. 544-193.000.
Inamoto, Yoshiaki; Fujikura, Yoshiaki; Tsuchihashi, Kiyoshi; and Kashihara, Eiji, 4,059,643, Cl. 260-666.0PY.
Kobayashi, Hisawo; and Watanabe, Takehiko, 4,059,382, Cl. 425-446.000.
Karhu-Titan Oy: *See*—
Tiitola, Antti-Jussi, 4,059,269, Cl. 273-67.00A.
Kerr, Philip R., to United States of America, Army. Fuze modulation system. 4,059,052, Cl. 102-70.20P.
Kashihara, Eiji: *See*—
Inamoto, Yoshiaki; Fujikura, Yoshiaki; Tsuchihashi, Kiyoshi; and Kashihara, Eiji, 4,059,643, Cl. 260-666.0PY.
Kashiwagi, Midori: *See*—
Norton, Ted R.; Shibata, Shoji; and Kashiwagi, Midori, 4,059,694, Cl. 424-177.000.
Kasima, Osamu; and Sanda, Shougo, to Nippondenso Co., Ltd.; and Toyota Jidosha Kogyo Kabushiki Kaisha. Internal combustion engine. 4,059,079, Cl. 123-30.00D.
Kato, Eiichi: *See*—
Sugiyama, Masatoshi; Kato, Eiichi; and Nakamura, Yasuharu, 4,059,448, Cl. 96-84.00A.
Kato, Osami: *See*—
Musha, Morito; Sawa, Tomizo; and Kato, Osami, 4,059,511, Cl. 210-23.00R.
Kawamura, Atsushi; and Kawazu, Motoaki, to Ricoh Co., Ltd. Fixture for mounting bar lens array in electrophotographic apparatus. 4,059,345, Cl. 350-252.000.
Kawano, Tatumi: *See*—
Iimuro, Hiroyuki; Horiuchi, Takumi; Kuroda, Yoji; Hori, Kikuo; and Kawano, Tatumi, 4,058,967, Cl. 57-140.00J.
Kawasaki Jukogyo Kabushiki Kaisha: *See*—
Yoshida, Toshio; Terai, Kiyoshi; Matsui, Shigetomo; Kinoshita, Tsuneo; Hoshi, Akira; and Tohmoto, Toru, 4,058,883, Cl. 29-448.000.
Kawasaki, Masahiro; and Ando, Hirokazu, to Asahi Kogaku Kogyo Kabushiki Kaisha. Bypass circuits for improving the response of electric shutters. 4,059,835, Cl. 354-24.000.
Kawasaki Yukogyo Kabushiki Kaisha: *See*—
Takahashi, Yutaka; and Kobayashi, Toshiji, 4,059,253, Cl. 266-259.000.

Kawazu, Motoaki: *See*—
Kawamura, Atsushi; and Kawazu, Motoaki, 4,059,345, Cl. 350-252.000.
Kay, Edward Leo: *See*—
Lawson, David Francis; and Kay, Edward Leo, 4,059,560, Cl. 260-45.70R.
Kayanuma, Nobuaki, to Toyota Jidosha Kogyo Kabushiki Kaisha. EVAP system-provided throttle valve control unit. 4,059,081, Cl. 123-136.000.
Kazi, Abdulla M. Z.: *See*—
Crompton, Charles E.; and Kazi, Abdulla M. Z., 4,059,540, Cl. 252-309.000.
Kazuhide, Takahama, to Simon International S.p.A. Reducible volume desk. 4,059,058, Cl. 108-129.000.
Kebabian, Paul L., to Environmental Research & Technology, Inc. Gas detector. 4,059,356, Cl. 356-204.000.
Kelley, Louis E., to Rohm and Haas Company. Bonded non-woven fabric and method for making it. 4,059,665, Cl. 264-128.000.
Kelly, Lawrence Francis Michael: *See*—
Jennings, James Robert; and Kelly, Lawrence Francis Michael, 4,059,542, Cl. 252-431.00P.
Kende, Andrew S.; and Liebeskind, Lanny S., to University of Rochester. Synthesis of steganacin and derivatives thereof. 4,059,593, Cl. 260-340.50R.
Kenk, Erhard: *See*—
Kenk, Theodor; and Kenk, Erhard, 4,059,132, Cl. 139-207.000.
Kenk, Theodor; and Kenk, Erhard, to Leder & Co., AG. Bobbin retainer on a shuttle. 4,059,132, Cl. 139-207.000.
Kennel, John M., to Rockwell International Corporation. Non-oscillating torque control apparatus. 4,059,790, Cl. 318-689.000.
Kern, Wolfgang: *See*—
Strunz, Dieter O.; and Kern, Wolfgang, 4,059,395, Cl. 432-72.000.
Kernforschungsanlage Julich GmbH: *See*—
Luhleich, Hartmut; Nickel, Hubertus; and Dias, Francesco, 4,059,682, Cl. 423-448.000.
Kessler, Reinhard: *See*—
Schulz, Horst; Flosser, Josef; Kessler, Reinhard; Schmidt, Karl-Heinz; Eisend, Ewald; Hild, Erich; Loffler, Karl-Heinz; and Steuer, Werner, 4,059,028, Cl. 74-781.00B.
Keusch, Wilhelm: *See*—
Goossens, Walter; Hermann, Wolfgang; Keüsch, Wilhelm; and Redlich, Rudolf, 4,059,412, Cl. 44-10.00H.
Khavkin, Viktor Pavlovich: *See*—
Movshovich, Pavel Mikhailovich; Khavkin, Viktor Pavlovich; Maximov, Gennady Konstantinovich; Babushkina, Natalya Borisovna; Baranov, Alexandr Anatolievich; Ivanov, Lev Nikolaevich; Nezelenov, Sergei Vladimirovich; Shutov, Gennady Nikolaevich; Tsygulev, Leonid Nikiforovich; and Ilin, Vadim Sergeevich, 4,058,960, Cl. 57-34.0AT.
Kido, Akio: *See*—
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Kidwell, Roger L.: *See*—
Ruest, Dennis A.; Kidwell, Roger L.; and Shen, Chung Y., 4,059,579, Cl. 544-172.000.
Kiel, Wolfgang: *See*—
Kritzler, Helmuth; Bohm, Walter; Kiel, Wolfgang; and Birkenstock, Udo, 4,059,627, Cl. 260-580.000.
Kienzle, Frank; and Rosen, Perry, to Hoffmann-La Roche, Inc. Synthesis of cyclopentanol. 4,059,577, Cl. 542-426.000.
Kijima, Yasuhiko: *See*—
Yonemitsu, Eiichi; Isshiki, Tomiya; and Kijima, Yasuhiko, 4,059,582, Cl. 260-252.000.
Kikusui Kagaku Kogyo Kabushiki Kaisha: *See*—
Tohyama, Masao; Ichigo, Minoru; Suzuki, Takeshi; Nakasu, Makoto; Ando, Akinobu; Yoshida, Akitoshi; Kosaka, Masaharu; Hayasi, Norihisa; and Inoue, Shigeki, 4,059,553, Cl. 260-29.60S.
Kim, Leo: *See*—
Wald, Milton M.; and Kim, Leo, 4,059,646, Cl. 260-676.00R.
Wald, Milton M.; and Kim, Leo, 4,059,647, Cl. 260-676.00R.
Kindl, Fred Henry, to Encotech, Inc. Method and apparatus for removal of last traces of soluble ash and elements from solvent refined coal. 4,058,976, Cl. 60-39.46S.
Kindred, Michael, to Invicta Plastics Limited. Word game having a board and a plurality of pieces. 4,059,273, Cl. 273-130.00R.
Kingswell, Leonard William; and Matthews, Oliver Charles, to Post Office, The. Data transmission system between telephone subscriber location and telephone exchange location during idle telephone condition. 4,059,727, Cl. 179-2.0AM.
Kinoshita, Tsuneo: *See*—
Yoshida, Toshio; Terai, Kiyoshi; Matsui, Shigetomo; Kinoshita, Tsuneo; Hoshi, Akira; and Tohmoto, Toru, 4,058,883, Cl. 29-448.000.
Kinoshita, Yoshio, to Glory Kogyo Kabushiki Kaisha. Coin classifying and counting machine. 4,059,122, Cl. 133-3.00D.
Kinsner, Witold; and Torre, Edward Della, to Canadian Patents and Development Limited. Multi state magnetic bubble domain cell for random access memories. 4,059,829, Cl. 365-19.000.
Kiovsky, Joseph R.; and Koradia, Pramad B., to Norton Company. Clinoptilolite sorbent. 4,059,543, Cl. 252-455.00Z.
Kira, Masaaki: *See*—
Arai, Fumio; Kira, Masaaki; Kokuryo, Shiro; and Ueshima, Takashi, 4,059,561, Cl. 260-45.80R.
Kiss, Sandor G. Alternate flow suction dredge. 4,058,914, Cl. 37-66.000.
Kitamoto, Tatsuji: *See*—
Aonuma, Masashi; Kitamoto, Tatsuji; and Akashi, Goro, 4,059,463, Cl. 148-105.000.
Kitamura, Takashi; Watanabe, Asao; Nakano, Takashi; Masaki, Katsumi; Hirayama, Kazuhiro; Sato, Yasushi; and Tokiwa, Taisuke, to Canon Kabushiki Kaisha. Recording position adjuster. 4,059,833, Cl. 346-108.000.
Kitano, Hisao: *See*—
Handa, Susumu; Tanaka, Yoshiaki; Nishibata, Atsushi; Ueda, Sadashi; Inamoto, Yoshiaki; Saito, Masahiro; Tanimoto, Fumio; and Kitano, Hisao, 4,059,610, Cl. 544-193.000.
Kitano, Nanahiko: *See*—
Yamaguchi, Yoshinobu; Kitano, Nanahiko; Watanabe, Yoshihisa; and Imanari, Makoto, 4,059,544, Cl. 252-471.000.
Kite, Francis E.: *See*—
Germino, Felix Joseph; Kite, Francis E.; and Christensen, Edwin H., 4,059,458, Cl. 106-213.000.
Kitoku Co., Ltd.: *See*—
Mizutani, Masumi; Hata, Hiromichi; and Shimazaki, Masasuke, 4,059,006, Cl. 73-17.00A.
Kitzinger, Frank; and Rosenblum, Frank, to Noranda Mines Limited. Froth level monitor. 4,059,016, Cl. 73-304.00R.
Klauke, Erich: *See*—
Wolfrum, Gerhard; Kuhnel, Werner; Klauke, Erich; and Buttner, Gerhard, 4,059,402, Cl. 8-2.50A.
Klein, Gerald L., to Beckman Instruments, Inc. Densitometer calibrated reference standard. 4,059,357, Cl. 356-243.000.
Klockner-Humboldt-Deutz Aktiengesellschaft: *See*—
Wurster, Winfried; Kuhne, Jochen; and Frodermann, Gerd, 4,059,019, Cl. 73-421.50A.
Klotzer, Sieghart: *See*—
Vanassche, Willy Joseph; Pattyn, Herman Alberik; Moisar, Erik; and Klotzer, Sieghart, 4,059,450, Cl. 96-101.000.
Knapp, Ronald H. Pressure and buckling resisting undulated polyhedral shell structure. 4,058,945, Cl. 52-244.000.
Knappenberger, Clifford W.: *See*—
Settlemyer, Bernard W.; Knappenberger, Clifford W.; and Bader, Alfred, 4,059,017, Cl. 73-395.000.
Knight, John H., to Superior Oil Company, The. Method for reducing residence time and eliminating gas leakage between zones in a cross-flow device for heating and cooling solids. 4,058,905, Cl. 34-15.000.
Knopka, William N., to Avtex Fibers Inc. Textile fiber blend comprising cellulosic fibers and ethylene 2,6-naphthalene dicarboxylate-halogenated comonomers copolyester fibers. 4,059,546, Cl. 260-16.000.
Knowles, Gregory W.; Sangesland, Odd E.; Vroom, Henry J.; and Madey, Robert W., to Grumman Aerospace Corporation. Solar energy collector. 4,059,093, Cl. 126-271.000.
Knox Manufacturing Co.: *See*—
Brown, Donald J., 4,059,339, Cl. 350-117.000.
Kobayashi, Hisawo; and Watanabe, Takehiko, to Kao Soap Co., Ltd. Apparatus for processing top ends of rod-like resin articles. 4,059,382, Cl. 425-446.000.
Kobayashi, Shinsaku: *See*—
Mishima, Hiroshi; Ogiso, Akira; and Kobayashi, Shinsaku, 4,059,641, Cl. 260-635.00R.
Kobayashi, Toshihiro, to Ishikawajima-Harima Jukogyo Kabushiki Kaisha. Apparatus for calcining powder materials. 4,059,393, Cl. 432-58.000.
Kobayashi, Toshiji: *See*—
Takahashi, Yutaka; and Kobayashi, Toshiji, 4,059,253, Cl. 266-259.000.
Kobayashi, Tsutomu; Archer, John L.; and Elliott, Michael T., to Rockwell International Corporation. Bubble lattice file structure. 4,059,828, Cl. 365-32.000.
Kobe, Inc.: *See*—
Andersen, Poul H.; and Erickson, John W., 4,059,364, Cl. 415-89.000.
Koch, Friedrich; and Fink, Lothar, to Sopecom S.A. Fribourg. Vehicle wheel pneumatic tyres and the manufacture thereof. 4,059,375, Cl. 425-589.000.
Koel, Maarten; and Theelen, Hubertus J., to U.S. Philips Corporation. Wound capacitor comprising an excess-pressure safety device. 4,059,848, Cl. 361-272.000.
Koepcke, Robert L., to Arro Corporation. Ski and pole tote. 4,059,208, Cl. 224-45.00S.
Kokuryo, Shiro: *See*—
Arai, Fumio; Kira, Masaaki; Kokuryo, Shiro; and Ueshima, Takashi, 4,059,561, Cl. 260-45.80R.
Kolbe, Andreas; and Dinter, Peter, to Hoechst Aktiengesellschaft. Corona apparatus. 4,059,497, Cl. 204-165.000.
Kolkman, Dick J., to Westinghouse Air Brake Company. Fail-safe time delay circuit. 4,059,845, Cl. 361-198.000.
Kolling, Helmut; Rappen, Friedrich; and Geiser, Nikolaus, to Ruhrchemie Aktiengesellschaft. Process for the production of polyethylene having molecular weights above 500,000. 4,059,720, Cl. 526-74.000.
Kolm, Jan: *See*—
Baklien, Asbjorn; and Kolm, Jan, 4,059,588, Cl. 260-306.70T.
Kominami, Naoya: *See*—
Iriguchi, Norio; Kuroda, Toru; Kominami, Naoya; and Inagaki, Kenji, 4,059,107, Cl. 128-173.00H.
Komine, Yoshio; and Hirata, Noritsugu, to Canon Kabushiki Kaisha. Photographing system and a motion picture camera using the same. 4,059,349, Cl. 352-72.000.

Kondo, Tatsunori: *See*—
Obayashi, Nobuharu; Hashizume, Hikaru; Sakashita, Noriji; Kameyama, Seiji; Ezawa, Sadaaki; Kugisawa, Toshio; Washiyama, Yutaka; Kondo, Tatsunori; and Watanabe, Hironori, 4,059,040, Cl. 84-1.030.

Kondratenko, Anatoly Borisovich: *See*—
Barannik, Ivan Andreevich; Kondratenko, Anatoly Borisovich; Trukhin, Alexandr Fedorovich; Raskatov, Viktor Georgievich; Zharovsky, Ivan Vasilievich; Rudakov, Viktor Alexandrovich; Mordkovich, Andrei Efremovich; and Chalov, Alexandr Vasilievich, 4,059,372, Cl. 425-8.000.

Konnai, Makoto: *See*—
Takematsu, Tetsuo; Konnai, Makoto; Takeda, Makoto; Fuga, Nobuhiko; Ikeda, Kaoru; and Shugaya, Kiyoshi, 4,059,431, Cl. 71-87.000.
Takematsu, Tetsuo; Konnai, Makoto; Takeda, Makoto; Fuga, Nobuhiko; Ikeda, Kaoru; and Shugaya, Kiyoshi, 4,059,432, Cl. 71-87.000.

Konz, Marvin Joseph, to FMC Corporation. Stereospecific process for production of c-3-aralkoxy-r-2-substituted-5-alkyl-1,3-dioxanes and intermediates. 4,059,594, Cl. 260-340.700.

Kopke, Helmut; Ohlinger, Manfred; Grau, Werner; Schoenafinger, Eduard; and Schneehage, Hans Henning, to BASF Aktiengesellschaft. Manufacture of gamma-iron(III) oxide. 4,059,716, Cl. 428-403.000.

Koradia, Pramad B.: *See*—
Kiovsky, Joseph R.; and Koradia, Pramad B., 4,059,543, Cl. 252-455.00Z.

Korff, Wolfram G.; Emery, Vernon V.; Bond, Joseph Kim; and Marcella, Joseph, to Emery Company, Inc. Method of belling plastic pipe and apparatus therefor. 4,059,379, Cl. 425-393.000.

Korshunov, Evgeny Alexeevich pereulok. Mill for rolling continuously cast ingot. 4,059,001, Cl. 72-214.000.

Kosaka, Katuaki; and Ueno, Zene, to Nissan Motor Co., Ltd. Method and apparatus for generating reformed gas containing hydrogen and carbon monoxide from hydrocarbon fuel. 4,059,076, Cl. 123-3.000.

Kosaka, Katuaki; Wagatsuma, Fumio; Shimomoto, Mithuo; Harada, Osamu; and Ueno, Zene, to Nissan Motor Co., Ltd. Apparatus for reforming combustible into gaseous fuel by reaction with decomposition product of hydrogen peroxide. 4,059,415, Cl. 48-63.000.

Kosaka, Masaharu: *See*—
Tohyama, Masao; Ichigo, Minoru; Suzuki, Takeshi; Nakasu, Makoto; Ando, Akinobu; Yoshida, Akitoshi; Kosaka, Masaharu; Hayasi, Norihisa; and Inoue, Shigeki, 4,059,553, Cl. 260-29.60S.

Kosan A/S: *See*—
Vestergaard, Bent, 4,058,931, Cl. 47-87.000.

Kosley, Raymond W., Jr.: *See*—
Parker, Kathlyn A.; and Kosley, Raymond W., Jr., 4,059,575, Cl. 260-239.500.

Kostelnicek, Richard J., to Exxon Production Research Company. Periodic waveform interference eliminator. 4,059,818, Cl. 340-15.5DP.

Koster, Sandra K.: *See*—
Blaha, Eli W.; Koster, Sandra K.; and Wang, Chen-Shen, 4,059,719, Cl. 526-52.000.

Kowalski, Daniel C.; Dawson, Juan C.; and Krulikoski, Stanley J., deceased (by Krulikoski, Shirley Ann, executrix), to United States of America, Air Force. Prismatic anamorphic system for optical correlators. 4,059,343, Cl. 350-182.000.

Kozhema, Valery Andreevich: *See*—
Esibian, Eduard Migranovich; Dudko, Daniil Andreevich; Danchenko, Mikhail Evgenievich; Malkin, Vasily Berkovich; and Kozhema, Valery Andreevich, 4,059,743, Cl. 219-121.00P.

Krasnow, Leonard L. Slide filters. 4,059,525, Cl. 210-236.000.

Krauss-Maffei Austria Gesellschaft m.b.H.: *See*—
Hanslik, Wilhelm, 4,059,401, Cl. 432-132.000.

Kresse, Herman J. Separation of mature okra seed into component fractions. 4,059,604, Cl. 260-412.400.

Kribitzneck, Otto: *See*—
Beinsen, Dieter; and Kribitzneck, Otto, 4,059,113, Cl. 128-276.000.

Krimm, Heinrich; and Tresper, Erhard, to Bayer Aktiengesellschaft. Trisphenol process. 4,059,638, Cl. 260-613.00R.

Kritzler, Helmuth; Bohm, Walter; Kiel, Wolfgang; and Birkenstock, Udo, to Bayer Aktiengesellschaft. Chlorinated aromatic amines. 4,059,627, Cl. 260-580.000.

Krivec, Bert; Brown, Elwood B.; and Raynor, Warren S., to Rexnord Inc. Roller assembly with improved mounting means. 4,059,180, Cl. 193-37.000.

Krolak, Donald W.: *See*—
Elbe, Ronald E.; Krolak, Donald W.; and Vernon, Philip L., 4,058,922, Cl. 42-16.000.

Kroll, Rudolf: *See*—
Grundmann, Edgard; Heitland, Herbert; and Kroll, Rudolf, 4,059,095, Cl. 126-271.000.

Krulikoski, Shirley Ann, executrix: *See*—
Kowalski, Daniel C.; Dawson, Juan C.; and Krulikoski, Stanley J., deceased, 4,059,343, Cl. 350-182.000.

Krulikoski, Stanley J., deceased: *See*—
Kowalski, Daniel C.; Dawson, Juan C.; and Krulikoski, Stanley J., deceased, 4,059,343, Cl. 350-182.000.

Kruse, Eckart. Cabinet. 4,058,861, Cl. 5-164.00R.

Kubicek, Donald H., to Phillips Petroleum Company. Mercaptans by catalytic cleavage of organic sulfides. 4,059,636, Cl. 260-609.00D.

Kubler, Hermann, to Barmag Barmer Maschinenfabrik Aktiengesellschaft. False twist-crimping machine. 4,058,961, Cl. 57-34.0HS.

Kubota, Ltd.: *See*—
Ryumon, Yutaka; Yano, Naomichi; and Yukimachi, Shinsuke, 4,059,193, Cl. 214-8.50A.

Kuffner, Karl: *See*—
Meier, Ernst; Credner, Hans Heinrich; Lassig, Wolfgang; Kuffner, Karl; and Schranz, Karl-Wilhelm, 4,059,447, Cl. 96-56.400.

Kugisawa, Toshio: *See*—
Obayashi, Nobuharu; Hashizume, Hikaru; Sakashita, Noriji; Kameyama, Seiji; Ezawa, Sadaaki; Kugisawa, Toshio; Washiyama, Yutaka; Kondo, Tatsunori; and Watanabe, Hironori, 4,059,040, Cl. 84-1.030.

Kuhlman Corporation: *See*—
Macemon, Herbert J., 4,059,329, Cl. 339-60.00R.

Kuhne, Jochen: *See*—
Wurster, Winfried; Kuhne, Jochen; and Frodermann, Gerd, 4,059,019, Cl. 73-421.50A.

Kuhne, Manfred, to Ciba-Geigy Corporation. Herbicidal compositions containing silylated chloroacetanilides. 4,059,436, Cl. 71-118.000.

Kuhnel, Werner: *See*—
Wolfrum, Gerhard; Kuhnel, Werner; Klauke, Erich; and Buttner, Gerhard, 4,059,402, Cl. 8-2.50A.

Kulzer & Co. GmbH: *See*—
Gross, Albert; Schaefer, Roland; and Reiss, Siegfried, 4,059,684, Cl. 424-4.000.

Kumazawa, Shigeru: *See*—
Tatsuta, Hatsumi; and Kumazawa, Shigeru, 4,059,765, Cl. 250-367.000.

Kume, Kazunari: *See*—
Tamaru, Munetaka; Kume, Kazunari; Oono, Hideshi; Watanabe, Minoru; Sato, Hideo; and Morokawa, Shigeru, 4,058,969, Cl. 58-23.0BA.

Kume, Toyohiko: *See*—
Aya, Masahiro; Saito, Junichi; Kume, Toyohiko; and Yasui, Kazuomi, 4,059,430, Cl. 71-86.000.

Kuntz, Gregg R. Shelf support bracket for mounting on railings and the like. 4,059,248, Cl. 248-214.000.

Kunzel, Hans Egon: *See*—
Wolf, Gerhard Dieter; Miessen, Ralf; Kunzel, Hans Egon; and Bentz, Francis, 4,059,403, Cl. 8-168.00B.

Kurata, Shigehiro; and Abe, Kenzo, to United Resources Industry Co., Ltd. Cross-flow type stripping-absorption apparatus. 4,059,421, Cl. 55-196.000.

Kuroda, Toru: *See*—
Iriguchi, Norio; Kuroda, Toru; Kominami, Naoya; and Inagaki, Kenji, 4,059,107, Cl. 128-173.00H.

Kuroda, Yoji: *See*—
Iimuro, Hiroyuki; Horiuchi, Takumi; Kuroda, Yoji; Hori, Kikuo; and Kawano, Tatumi, 4,058,967, Cl. 57-140.00J.

Kwap, Theodore William: *See*—
Gulitz, Louis; Kwap, Theodore William; Lisle, Walter Irving; O'Kane, Daniel Francis; and Poponiak, Michael Robert, 4,059,385, Cl. 431-12.000.

L. R. Nelson Corporation: *See*—
Pescetto, James R., 4,059,229, Cl. 239-183.000.

Labelette Company: *See*—
Wesley, John George, 4,059,477, Cl. 156-479.000.

Lagrange, Alain: *See*—
Nicolas, Jean; Lagrange, Alain; and Hildebrandt, Nieczyslaw, 4,059,664, Cl. 264-66.000.

L'air Liquide, Societe Anonyme pour l'etude et l'exploitation des Procedes Georges Claude: *See*—
Bentz, Gerard, 4,059,424, Cl. 62-49.000.

Lallement, Jacques; Parc, Guy; and de Gaudemaris, Gabriel, to Institut Francais du Petrole. Improved process for preparing superbasic detergent additives. 4,059,536, Cl. 252-33.300.

Lalu, Jean-Pierre: *See*—
Foulletier, Louis; and Lalu, Jean-Pierre, 4,059,629, Cl. 260-583.0GG.

Lamb, Donald: *See*—
Cartwright, Colin William; and Lamb, Donald, 4,059,505, Cl. 208-310.00Z.

Lambert, Harold W.: *See*—
Miller, Bernard; Martin, J. Ronald; Meiser, Charles H., Jr.; Lambert, Harold W.; and Buvel, Harry, 4,059,007, Cl. 73-190.00R.

Laminoirs Trefileries Cableries de Lens (Anciens Etablissements Gaillard-Stievenart): *See*—
Leturgez, Georges Joseph, 4,058,894, Cl. 30-251.000.

Lamons Metal Gasket Company: *See*—
Owen, Alfred B.; and Gifford, Bruce M., 4,059,215, Cl. 228-173.00C.

Lamphere, Jack C.: *See*—
Zweigle, Maurice L.; and Lamphere, Jack C., 4,059,552, Cl. 260-29.6TA.

Landry, Joseph Elide: *See*—
Green, John Henry; and Landry, Joseph Elide, 4,059,731, Cl. 179-15.0BY.

Lang, Ernest U., to National-Standard Company. Band clutch assembly. 4,059,177, Cl. 192-41.00S.

Lang, Robert J.: *See*—
Schlosberg, Richard H.; Gorbaty, Martin L.; and Lang, Robert J., 4,059,410, Cl. 44-1.00R.

Langsley, Gerald William, to Coalite and Chemical Products Limited. Antioxidant resins from mercaptoaldehydes. 4,059,569, Cl. 260-48.000.

Lardon, Marcel; and Pluker, Hans, to Balzers Patent-Und Beteiligungs-

Aktiengesellschaft. Apparatus for determining the rate of flow of particles in a vacuum deposition device. 4,059,067, Cl. 118-7.000.
Larsen, Glen D., to Southern Railway Company. Coupler height adjuster for railway cars. 4,059,192, Cl. 213-61.000.
Lassig, Wolfgang: *See*—
Meier, Ernst; Credner, Hans Heinrich; Lassig, Wolfgang; Kuffner, Karl; and Schranz, Karl-Wilhelm, 4,059,447, Cl. 96-56.400.
Latham, Allen, Jr., to Haemonetics Corporation. Process for pheresis procedure and disposable pheresis bowl therefor. 4,059,108, Cl. 128-214.00R.
Lattion, Andre: *See*—
Spescha, Gelli; and Lattion, Andre, 4,058,962, Cl. 57-34.00R.
Laubie, Michel: *See*—
Vincent, Michel; Remond, Georges; and Laubie, Michel, 4,059,621, Cl. 260-558.00R.
Laughlin, John M. Switch and operating mechanism for circular hosiery knitting machine speed control. 4,059,740, Cl. 200-52.00R.
Laurie, James Ernest: *See*—
Davis, Trevor Crombie Maitland; and Laurie, James Ernest, 4,059,672, Cl. 423-121.000.
Laursen, Ove, to AB IRO. Thread storage and supply device. 4,059,240, Cl. 242-47.010.
Lavanish, Jerome M.: *See*—
Sare, Edward J.; and Lavanish, Jerome M., 4,059,677, Cl. 423-240.000.
Lavenir, Roger: *See*—
Roth, Jacques; Roth, Michel; Seiler, Paul; Lavenir, Roger; and Manigold, Alain, 4,059,660, Cl. 264-46.400.
Lawn, Joseph R.: *See*—
Lowery, Robert D.; Baxter, Donald J.; and Lawn, Joseph R., 4,059,176, Cl. 192-12.0BA.
Lawrence Brothers, Inc.: *See*—
Zbinden, James; and Ries, George W., 4,059,162, Cl. 173-37.000.
Lawson, David Francis; and Kay, Edward Leo, to Firestone Tire & Rubber Company, The. Smoke and flame retarded styrene polymers. 4,059,560, Cl. 260-45.70R.
Lear Siegler, Inc.: *See*—
Gabriele, Leonard A., 4,058,999, Cl. 72-102.000.
Leathers, Joel F. M.; and Calvin, Donald W., to Dow Chemical Company, The. Method of preparing fumed SiO_2. 4,059,680, Cl. 423-337.000.
Lebow Associates, Inc.: *See*—
Brendel, Albert E.; and Sedman, Myron P., 4,059,005, Cl. 73-1.00B.
Le Count, David James; and Squire, Christopher John, to Imperial Chemical Industries Limited. Alkanolamine derivatives. 4,059,622, Cl. 260-559.00A.
Leder & Co., AG: *See*—
Kenk, Theodor; and Kenk, Erhard, 4,059,132, Cl. 139-207.000.
Ledgerwood, Harry James, to Plessey Incorporated. Stock feeder for punched stock. 4,059,212, Cl. 226-141.000.
Lee, Ta-Jyh: *See*—
Smith, Robert L.; Lee, Ta-Jyh; and Cragoe, Edward J., Jr., 4,059,587, Cl. 260-301.000.
Lee, Yuan Ho. Automatic high-speed cold heading machine. 4,058,865, Cl. 10-13.000.
Lefort, Marcel: *See*—
Calas, Raymond; Dunogues, Jacques; Deleris, Gerard; Lefort, Marcel; and Simonnet, Christian, 4,059,608, Cl. 260-448.20E.
Lehman, James A., to Warner-Lehman Corporation. Flying saucer launching pistol. 4,059,089, Cl. 124-27.000.
Lehmann, Rolf, to Escher Wyss Limited. Deflection-controlled roll for the pressure treatment of materials in web form. 4,058,877, Cl. 29-116.0AD.
Lehmann, Rolf, to Escher Wyss Limited. Controlled deflection roll. 4,058,878, Cl. 29-116.0AD.
Lehureau, Jean-Claude: *See*—
Bricot, Claude; and Lehureau, Jean-Claude, 4,059,841, Cl. 358-128.000.
Leiby, Clare C., Jr.; and Prasad, Balram. Coherent counter-streaming electrostatic wave raman interaction system utilizing opposing electron beams for the production of coherent microwaves in plasmas. 4,059,813, Cl. 331-94.000.
Leipelt, Paul A.: *See*—
Anders, Walter G.; Cole, Michael A.; Duncan, James C.; and Leipelt, Paul A., 4,059,246, Cl. 243-7.000.
Leiser, Roger S.: *See*—
Schollmeier, Charles E.; and Leiser, Roger S., 4,059,460, Cl. 127-29.000.
Lendi, Georges; Hardegger, Bruno; and De Trey, Rene, to Tesa S.A. Plug gage. 4,058,901, Cl. 33-178.00R.
Lentz, James A.; and Safford, George J., to Xerox Corporation. Compositions and method for enhancing electrical life of polymers used in xerographic devices. 4,058,879, Cl. 29-132.000.
Lentz, Lawrence R., to Champion Spark Plug Company. Spark plug. 4,059,782, Cl. 315-58.000.
Leturgez, Georges Joseph, to Laminoirs Trefileries Cableries de Lens (Anciens Etablissements Gaillard-Stievenart). Lever-operated shears. 4,058,894, Cl. 30-251.000.
Lever Brothers Company: *See*—
Green, Robin John; Johnson, Richard Shaw; and Potter, John Kenneth, 4,059,538, Cl. 252-95.000.
Levine, Howard S.; and Winter, Robert, to Grumman Aerospace Corporation. Controlled focus mirror with rim controlled flexure. 4,059,346, Cl. 350-295.000.
Lewin, Ian, to American Louver Company. Louver for light distribution. 4,059,754, Cl. 362-217.000.
Lewis, Charles E.: *See*—
Bonecutter, Thayer A.; Lewis, Charles E.; and Smith, John E., 4,059,816, Cl. 337-278.000.
Lewis, Kenneth Dan, to Dorr-Oliver Incorporated. Centrifuge pressure relief device. 4,059,223, Cl. 233-1.00R.
Lewis, Sheldon N.; and Haggard, Richard A., to Rohm and Haas Company. Novel methacrylic polymers having allyl functionality. 4,059,616, Cl. 526-66.000.
Libbey-Owens-Ford Company: *See*—
Mattimoe, Paul T.; Motter, Theodore J.; Hofmann, John J.; and Herliczek, Siegfried H., 4,059,469, Cl. 156-108.000.
Liddell, Orval E. Protection of metallic structural elements against corrosion. 4,058,985, Cl. 61-54.000.
Liebeskind, Lanny S.: *See*—
Kende, Andrew S.; and Liebeskind, Lanny S., 4,059,593, Cl. 260-340.50R.
Liftex Slings, Inc.: *See*—
Barthule, George, 4,059,302, Cl. 294-74.000.
Lignes Telegraphiques et Telephoniques: *See*—
de Laage de Meux, Patrick M.; and Maitre, Michel J., 4,059,805, Cl. 329-50.000.
Lilly, Charles E.: *See*—
Struble, Dean L.; and Lilly, Charles E., 4,059,689, Cl. 424-84.000.
Lim, Franklin: *See*—
Sodickson, Lester A.; and Lim, Franklin, 4,059,405, Cl. 23-230.00R.
Limes, Robert W.; and Russell, Robert O., to Republic Steel Corporation. Production of fast-setting bonded aggregate structures. 4,059,455, Cl. 106-58.000.
Lindberg, Robert C.; Reedy, James D.; and Yang, Kang, to Continental Oil Company. Decomposition of halogenated organic compounds. 4,059,683, Cl. 423-481.000.
Linde, John P.; and Bullis, Douglas E., to Remington Arms Company, Inc. Concepts of remington super trap choke. 4,058,925, Cl. 42-79.000.
Linden-Alimak AB: *See*—
Granholm, Sven, 4,058,986, Cl. 61-63.000.
Lindsay, Alexander David, to American Cyanamid Company. Dermal toxicity of solid compositions containing a montmorillonite type of clay and an organophosphorus pesticide. 4,059,700, Cl. 424-216.000.
Linread Limited: *See*—
Foster, Graham Terence, 4,058,866, Cl. 10-155.00A.
Lipp, Eberhard; and Jurgens, Hans-Hermann, to Gebr. Lodige Maschinenbau-Gesellschaft mbH, Firma. Device for the heat treatment of bulk material. 4,058,907, Cl. 34-61.000.
Lisle, Walter Irving: *See*—
Gulitz, Louis; Kwap, Theodore William; Lisle, Walter Irving; O'Kane, Daniel Francis; and Poponiak, Michael Robert, 4,059,385, Cl. 431-12.000.
Litton Systems, Inc.: *See*—
Baron, David A., 4,059,742, Cl. 219-10.55D.
Livshits, Abram Lazarevich: *See*—
Vasiliev, Vladimir Sergeevich; Livshits, Abram Lazarevich; Polotsky, Vadim Evgenievich; and Zlatkin, Yakov Iosifovich, 4,059,788, Cl. 318-577.000.
Lo, Allen Kwok Wah; and Nims, Jerry Curtis, to Dimensional Development Corporation. Stereoscopic photograph composition apparatus. 4,059,354, Cl. 355-22.000.
Loffler, Karl-Heinz: *See*—
Schulz, Horst; Flosser, Josef; Kessler, Reinhard; Schmidt, Karl-Heinz; Eisend, Ewald; Hild, Erich; Loffler, Karl-Heinz; and Steuer, Werner, 4,059,028, Cl. 74-781.00B.
Logan, Arthur D.: *See*—
Phillips, Alfred R.; and Logan, Arthur D., 4,059,847, Cl. 361-215.000.
Lopker, Edwin B., to Pullman Incorporated. Method for manufacturing phosphoric acid and gypsum. 4,059,674, Cl. 423-167.000.
Lord, Henry A.: *See*—
Reifers, Richard F.; Bixler, Kenneth D.; and Lord, Henry A., 4,059,219, Cl. 229-2.5EC.
Lorenz, Achim R., to MacMillan Bloedel Containers, Inc. Reinforced single-face corrugated containers. 4,059,220, Cl. 229-37.00R.
Loveless, Norman P.: *See*—
Rosenberg, Ira E.; Ferguson, John A.; and Loveless, Norman P., 4,059,688, Cl. 424-71.000.
Lovely, John W.; and Hobbs, Robert N., to Bryant Grinder Corporation. Interform grinding machine. 4,058,934, Cl. 51-5.00D.
Lowery, Robert D.; Baxter, Donald J.; and Lawn, Joseph R., to Marquette Metal Products Company. Unitary spring clutch brake and actuator assembly. 4,059,176, Cl. 192-12.0BA.
Lu, Chin H.; and Parent, Richard A., to Xerox Corporation. Liquid development using conductive inks. 4,059,444, Cl. 96-1.0LY.
Luhleich, Hartmut; Nickel, Hubertus; and Dias, Francesco, to Kernforschungsanlage Julich GmbH. Method of making shaped carbonaceous bodies. 4,059,682, Cl. 423-448.000.
Lummus Company, The: *See*—
Bauer, William V., 4,059,504, Cl. 208-255.000.
Sze, Morgan C.; Schindler, Harvey D.; and Fanelli, Anthony, 4,059,503, Cl. 208-254.00H.
Lumsden, Roy W. Sewage purification system. 4,059,521, Cl. 210-195.00S.
Lundberg, George A.: *See*—
Moberg, Sigurd Manfred; and Lundberg, George A., 4,059,300, Cl. 292-322.000.
Luppi, Libero. Dialyzer cartridge of roll type particularly for extracorporal artificial kidneys. 4,059,530, Cl. 210-321.00B.
Lydon, Ralph P.; and Weismueller, Sr. William A. Automatic screw

driver system and method for utilizing same. 4,058,884, Cl. 29-526.00R.
Macawber Engineering Limited: *See—*
MacDonald, Eric John Christopher; and Snowdon, Brian, 4,059,195, Cl. 214-44.00R.
Maccone, Sergio: *See—*
Pinamonti, Franco; and Maccone, Sergio, 4,059,698, Cl. 424-211.000.
MacDonald, Eric John Christopher; and Snowdon, Brian, to Macawber Engineering Limited. Material handling device. 4,059,195, Cl. 214-44.00R.
Macemon, Herbert J., to Kuhlman Corporation. Double bushing well with cantilever load supporting legs. 4,059,329, Cl. 339-60.00R.
Macier, Robert Raymond: *See—*
Gilbert, Kendall E.; Johnson, Daniel; and Macier, Robert Raymond, 4,058,975, Cl. 60-39.28T.
Mack, Heinz; and Singer, Gunter, to Heinz Mack. Dental articulator. 4,058,895, Cl. 32-32.000.
Mackay, Robin, to Garrett Corporation, The. Uninterruptible electric power supply. 4,059,770, Cl. 290-4.00C.
MacMillan Bloedel Containers, Inc.: *See—*
Lorenz, Achim R., 4,059,220, Cl. 229-37.00R.
Macovski, Albert, to Maxim Diagnostic Imaging. Back-illuminated transparency contrast enhancement system. 4,059,767, Cl. 250-461.00R.
Maddox, James A. Labels and label readers. 4,059,225, Cl. 235-437.000.
Madey, Robert W.: *See—*
Knowles, Gregory W.; Sangesland, Odd E.; Vroom, Henry J.; and Madey, Robert W., 4,059,093, Cl. 126-271.000.
Madsen, Elmer W.; and Soden, George B., to North American Philips Corporation. Gear train with integral stop. 4,059,024, Cl. 74-421.00R.
Maeda, Sadao: *See—*
Nishiyama, Keizo; Maeda, Sadao; and Iwata, Kohshi, 4,059,710, Cl. 427-307.000.
Magg, Alfred; and Thurau, Gunther, to Zahnradfabrik Friedrichshafen Aktiengesellschaft. Gear-shifting jaw clutch for speed-changing vehicular transmission. 4,059,178, Cl. 192-53.00F.
Maier, Rudolf, to J. M. Voith GmbH. Extruder head. 4,059,373, Cl. 425-192.00R.
Maitre, Michel J.: *See—*
de Laage de Meux, Patrick M.; and Maitre, Michel J., 4,059,805, Cl. 329-50.000.
Makarov, Evgeny Fredovich: *See—*
Alexandrov, Anatoly Julianovich; Grushko, July Sergeevich; Makarov, Evgeny Fredovich; Mishin, Konstantin Yakovlevich; and Baltrunas, Daljus Antanas Jono, 4,059,769, Cl. 250-493.000.
Makimoto, Mitsuo; and Yamashita, Sadahiko, to Matsushita Electric Industrial Co., Limited. Coaxial cavity resonator. 4,059,815, Cl. 333-82.0BT.
Malkin, Vasily Berkovich: *See—*
Esibian, Eduard Migranovich; Dudko, Daniil Andreevich; Danchenko, Mikhail Evgenievich; Malkin, Vasily Berkovich; and Kozhema, Valery Andreevich, 4,059,743, Cl. 219-121.00P.
Mancke, Ralph Gustavus; and Soos, Nicholas Alec, to Bell Telephone Laboratories, Incorporated. Method for removal of elastomeric silicone coatings from integrated circuits. 4,059,467, Cl. 156-80.000.
Manderscheid, Phillip H., to Brown Oil Tools, Inc. Anchoring assembly. 4,059,150, Cl. 166-120.000.
Manigold, Alain: *See—*
Roth, Jacques; Roth, Michel; Seiler, Paul; Lavenir, Roger; and Manigold, Alain, 4,059,660, Cl. 264-46.400.
Manno Kogyo Company, Limited: *See—*
Iida, Hiroshi, 4,059,197, Cl. 214-451.000.
Mannstrom, Bo Knut, to Oy Keskuslaboratorio - Centrallaboratorium, Ab. System for feeding a double disc refiner. 4,059,237, Cl. 241-246.000.
Mano, Hiroshi: *See—*
Ariyama, Kenzo; Mano, Hiroshi; and Kamiyama, Shinichi, 4,059,394, Cl. 432-59.000.
Mansfield, Wilfred Percival; and Priede, Theodor, to National Research Development Corporation. Engine structure. 4,059,085, Cl. 123-195.00R.
Marcella, Joseph: *See—*
Korff, Wolfram G.; Emery, Vernon V.; Bond, Joseph Kim; and Marcella, Joseph, 4,059,379, Cl. 425-393.000.
Marconi Company Limited, The: *See—*
Byatt, Dennis William George, 4,059,827, Cl. 365-126.000.
Marion Laboratories, Inc.: *See—*
Mathison, Ian William; Solomons, William Ebenezer; and Jones, Raymond Henry, 4,059,586, Cl. 260-287.00D.
Markert, Gerhard: *See—*
Hitzler, Otto; Pennewiss, Horst; Froelich, August; Markert, Gerhard; and Wunderlich, Winfried, 4,059,574, Cl. 260-192.000.
Markley, Lowell D.: *See—*
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Markowski, Stanley J.; and Nolan, James J., to United Technologies Corporation. Low emission combustion chamber. 4,058,977, Cl. 60-39.650.
Marquette Metal Products Company: *See—*
Lowery, Robert D.; Baxter, Donald J.; and Lawn, Joseph R., 4,059,176, Cl. 192-12.0BA.
Marshall, Richard Clarence. Gaseous fluid compressing apparatus. 4,059,367, Cl. 417-203.000.
Martin, Clyde J.; and Nicholson, Floyd A., to Tyrspy Inc. Tire pressure indicator. 4,059,823, Cl. 340-58.000.
Martin, J. Ronald: *See—*
Miller, Bernard; Martin, J. Ronald; Meiser, Charles H., Jr.; Lambert, Harold W.; and Buvel, Harry, 4,059,007, Cl. 73-190.00R.
Martin Marietta Aerospace: *See—*
Eddy, Wesley L.; Mullen, Daniel J.; and Bonham, Arthur R., 4,059,729, Cl. 179-15.0BF.
Marton, Miksa. Vacuum sander. 4,058,936, Cl. 51-170.00T.
Masaki, Katsumi: *See—*
Kitamura, Takashi; Watanabe, Asao; Nakano, Takashi; Masaki, Katsumi; Hirayama, Kazuhiro; Sato, Yasushi; and Tokiwa, Taisuke, 4,059,833, Cl. 346-108.000.
Maschinenfabrik Fahr Aktiengesellschaft Gottmadingen: *See—*
Purrer, Josef, 4,059,234, Cl. 241-222.000.
Mason, Neil E. Pistol adapted for dispensing debilitating chemical repellants. 4,058,921, Cl. 42-1.00G.
Massachusetts Institute of Technology: *See—*
Fan, John C. C.; and Zeiger, Herbert J., 4,059,461, Cl. 148-1.500.
Massey-Ferguson Inc.: *See—*
Waack, Carl L.; and Giss, Alador J., 4,059,025, Cl. 74-482.000.
Mast, Aquila D.: *See—*
Sadler, Loren G.; and Mast, Aquila D., 4,058,958, Cl. 56-228.000.
Masuda, Yoshitaka: *See—*
Yoshizaki, Hiroyuki; Takanihashi, Hiromitsu; and Masuda, Yoshitaka, 4,059,565, Cl. 260-47.0XA.
Masuho, Yasuhiko: *See—*
Tomibe, Katsuhiko; Masuho, Yasuhiko; Matsuzawa, Kimihiko; Ishimoto, Sachio; Satake, Kazuo; and Watanabe, Tsuneo, 4,059,571, Cl. 260-112.00B.
Masumoto, Hakaru; Murakami, Yuetsu; and Nakamura, Naoji, to Foundation: The Research Institute of Electric and Magnetic Alloys, The. Niobium-iron rectangular hysteresis magnetic alloy. 4,059,462, Cl. 148-31.550.
Mathis, Ronald D.; and Dix, James S., to Phillips Petroleum Company. Antistatic dyeable polyamide composition. 4,059,653, Cl. 260-857.0PG.
Mathison, Ian William; Solomons, William Ebenezer; and Jones, Raymond Henry, to Marion Laboratories, Inc. 5-Alkoxy-2-alkyl-1,2,3,4-tetrahydroisoquinolene-8-carboxaldehyde and derivatives. 4,059,586, Cl. 260-287.00D.
Matovich, Edwin, to Thagard Technology Company. Chemical reaction process utilizing fluid-wall reactors. 4,059,416, Cl. 48-197.00R.
Matsui, Shigetomo: *See—*
Yoshida, Toshio; Terai, Kiyoshi; Matsui, Shigetomo; Kinoshita, Tsuneo; Hoshi, Akira; and Tohmoto, Toru, 4,058,883, Cl. 29-448.000.
Matsumura, Yoshihiro: *See—*
Shono, Tatsuya; and Matsumura, Yoshihiro, 4,059,595, Cl. 260-345.90R.
Matsushita Electric Industrial Co., Ltd.: *See—*
Hirose, Huminori, 4,059,245, Cl. 242-201.000.
Makimoto, Mitsuo; and Yamashita, Sadahiko, 4,059,815, Cl. 333-82.0BT.
Oita, Masahiro; Hirohata, Hyogo; and Hamasaki, Nobuhiro, 4,059,451, Cl. 106-1.260.
Serizawa, Masabumi; and Takezaki, Tsuneo, 4,059,791, Cl. 363-37.000.
Matsushita Electronics Corporation: *See—*
Hosokoshi, Kakuichiro; Yamamoto, Hikoshi; Tanaka, Masayuki; and Omura, Shinichi, 4,059,834, Cl. 354-1.000.
Matsuzaki, Mitsuyuki: *See—*
Suzuki, Kensuke; Sasaki, Takeshi; and Matsuzaki, Mitsuyuki, 4,059,837, Cl. 357-73.000.
Matsuzawa, Kimihiko: *See—*
Tomibe, Katsuhiko; Masuho, Yasuhiko; Matsuzawa, Kimihiko; Ishimoto, Sachio; Satake, Kazuo; and Watanabe, Tsuneo, 4,059,571, Cl. 260-112.00B.
Matthews, Oliver Charles: *See—*
Kingswell, Leonard William; and Matthews, Oliver Charles, 4,059,727, Cl. 179-2.0AM.
Mattimoe, Paul T.; Motter, Theodore J.; Hofmann, John J.; and Herliczek, Siegfried H., to Libbey-Owens-Ford Company. Glazing units, methods of making the same and adhesion promoters therefor. 4,059,469, Cl. 156-108.000.
Maul, John A.; and Valentine, Richard E., to Addressograph Multigraph Corporation. Data recorder with portable cartridge. 4,059,051, Cl. 101-45.000.
Maurer, Fritz; Riebel, Hans-Jochem; Hammann, Ingeborg; Behrenz, Wolfgang; and Homeyer, Bernhard, to Bayer Aktiengesellschaft. Pyrimidine (4,6)diyl-bis-(thiono)(thiol)-phosphoric(phosphonic)acid esters. 4,059,696, Cl. 424-200.000.
Mauri, Ambrogio. Light alloy body structure, particularly for transport vehicles, and a process for its formation. 4,059,303, Cl. 296-28.00M.
Maxim Diagnostic Imaging: *See—*
Macovski, Albert, 4,059,767, Cl. 250-461.00R.
Maximov, Gennady Konstantinovich: *See—*
Movshovich, Pavel Mikhailovich; Khavkin, Viktor Pavlovich; Maximov, Gennady Konstantinovich; Babushkina, Natalya Borisovna; Baranov, Alexandr Anatolievich; Ivanov, Lev Nikolaevich; Nezelenov, Sergei Vladimirovich; Shutov, Gennady Nikolaevich; Tsygulev, Leonid Nikiforovich; and Ilin, Vadim Sergeevich, 4,058,960, Cl. 57-34.0AT.
Mayer, Adolf: *See—*
Hausweiler, Arnold; Mayer, Adolf; and Bitners, Feliks, 4,059,492, Cl. 203-11.000.
Mazuir, Maurice, to Carpano & Pons. Synchronous motor. 4,059,780, Cl. 310-164.000.

McBrayer, Doyle C., to Erdmannsdorff, Max Von. Synthetic monument marker. 4,058,940, Cl. 52-104.000.

McCauley, Roger A. Fuel conservation means for internal combustion engines and the like. 4,059,082, Cl. 123-141.000.

McClain, Richard D., to Mercury Metal Products, Inc. Engine exhaust rain cap with extruded bearing support means. 4,059,045, Cl. 98-122.000.

McClernon, Joseph R.: *See*—
Derr, Walter R.; McClernon, Joseph R.; McGovern, Stephen J.; and Smith, Fritz A., 4,059,648, Cl. 260-676.00R.

McCloskey, Albert R., to Heim Universal Corporation, The. Spherical bearing with slotted key. 4,059,317, Cl. 308-72.000.

McCollough, John K., to Milliken Research Corporation. Dyeing machine. 4,058,991, Cl. 68-205.00R.

McComsey, David Fred; and Zelesko, Michael John, to McNeil Laboratories, Incorporated. Substituted indoles. 4,059,583, Cl. 260-256.50R.

McCoy, Willie. Home shopping cart. 4,059,285, Cl. 280-651.000.

McCuaig, Franklin D., to United States of America, Energy Research and Development Administration. Pu-Zr alloy for high-temperature foil-type fuel. 4,059,439, Cl. 75-122.700.

McDonald, David Ian, to Cincinnati Milacron Inc. Manual preform removal device. 4,059,188, Cl. 198-477.000.

McGahan, Wallace A.; Webb, Paul D.; and Morse, Henry W., to Ingersoll-Rand Company. Gas compressor unloading means. 4,059,368, Cl. 417-243.000.

McGivern, Robert F., to Sybron Corporation. Baffle for water or sewage settling tanks. 4,059,529, Cl. 210-519.000.

McGovern, Stephen J.: *See*—
Derr, Walter R.; McClernon, Joseph R.; McGovern, Stephen J.; and Smith, Fritz A., 4,059,648, Cl. 260-676.00R.

McGraw-Edison Company: *See*—
Bonecutter, Thayer A.; Lewis, Charles E.; and Smith, John E., 4,059,816, Cl. 337-278.000.

McKenney's, Inc.: *See*—
Arrowood, Gordon W., 4,058,859, Cl. 4-252.00R.

McLean, Robert L.: *See*—
Greatbatch, Wilson; Mead, Ralph T.; McLean, Robert L.; Rudolph, Frank W.; and Frenz, Norbert W., 4,058,889, Cl. 29-623.500.

McNeil Corporation: *See*—
Tallon, James I., 4,058,917, Cl. 40-125.00M.

McNeil Laboratories, Incorporated: *See*—
McComsey, David Fred; and Zelesko, Michael John, 4,059,583, Cl. 260-256.50R.

McPeters, Arnold L.: *See*—
Bittle, David F.; and McPeters, Arnold L., 4,059,668, Cl. 264-290.00R.

Meacham, James H., to Westinghouse Electric Corporation. Method and apparatus for synchronizing a digital divider chain with a low frequency pulse train. 4,059,842, Cl. 358-150.000.

Mead, Ralph T.: *See*—
Greatbatch, Wilson; Mead, Ralph T.; McLean, Robert L.; Rudolph, Frank W.; and Frenz, Norbert W., 4,058,889, Cl. 29-623.500.

Medtronic, Inc.: *See*—
Adams, John M., 4,059,116, Cl. 128-419.0PG.

Meers, John Laurence, to Imperial Chemical Industries Limited. Production of glucose isomerase. 4,059,489, Cl. 195-31.00F.

Meier, Ernst; Credner, Hans Heinrich; Lassig, Wolfgang; Kuffner, Karl; and Schranz, Karl-Wilhelm, to AGFA-Gevaert Aktiengesellschaft. Photographic material containing oxazolinone-2 couplers. 4,059,447, Cl. 96-56.400.

Meier-Maletz, Gerhard: *See*—
Gernhardt, Wolfram; Meier-Maletz, Gerhard; and Zeutschel, Heinz, 4,059,475, Cl. 156-379.000.

Meiner, George H., III: *See*—
Bridwell, John W.; and Meiner, George H., III, 4,059,042, Cl. 91-469.000.

Meiser, Charles H., Jr.: *See*—
Miller, Bernard; Martin, J. Ronald; Meiser, Charles H., Jr.; Lambert, Harold W.; and Buvel, Harry, 4,059,007, Cl. 73-190.00R.

Melindo, Flavio: *See*—
Perucca, Giovanni; Melindo, Flavio; and De Vincentiis, Girolamo, 4,059,736, Cl. 179-175.20R.

Mercer, Frank Brian, to Netlon Limited. Extruded plastics net or mesh structures. 4,059,713, Cl. 428-36.000.

Merck & Co., Inc.: *See*—
Cragoe, Edward J., Jr.; and Bicking, John B., 4,059,601, Cl. 260-408.000.
Cragoe, Edward J., Jr.; and Bicking, John B., 4,059,602, Cl. 260-408.000.
Smith, Robert L.; Lee, Ta-Jyh; and Cragoe, Edward J., Jr., 4,059,587, Cl. 260-301.000.

Mercury Metal Products, Inc.: *See*—
McClain, Richard D., 4,059,045, Cl. 98-122.000.

Meredith, Curtis L.: *See*—
Von Bodungen, George A.; and Meredith, Curtis L., 4,059,654, Cl. 260-897.00A.

Messerschmitt, David Gavin; and Zebo, Timothy James, to Bell Telephone Laboratories, Incorporated. Apparatus for mitigating signal distortion and noise signal contrast in a communications system. 4,059,730, Cl. 179-15.0AS.

Messing, Terry Glen, to ESB Incorporated. Composite of metal and insulating material with setback which exposes battery terminal. 4,059,718, Cl. 429-162.000.

Messing, Terry Glen: *See*—
Bredland, Alf Marlov; Fong, Walter Lee; Messing, Terry Glen; and Paulson, John Walter, 4,059,717, Cl. 429-162.000.

Metal Box Limited: *See*—
Franek, Jozef Tadeusz; and Doncaster, Peter Henry, 4,058,998, Cl. 72-84.000.

Metsa-Ketela, Jorma. Conveyor for granular material. 4,059,508, Cl. 209-151.000.

Meyer, Donald R., to Richardson-Merrell Inc. 3,8-Bis-basic ethers of 6H-dibenzo[b,d]pyran-6-one. 4,059,702, Cl. 424-248.550.

Meyer, Engelbert Anthony, to USM Corporation. Molding retainer. 4,059,301, Cl. 293-62.000.

Meyer, Lewis M., to Diamond Shamrock Corporation. Metal laminate strip construction of bipolar electrode backplates. 4,059,216, Cl. 228-179.000.

Michel, Paul-Marie: *See*—
De Vos, Daniel; Michel, Paul-Marie; and Berger, Alfred, 4,059,423, Cl. 65-21.000.

Micro-Copy, Inc.: *See*—
Fritsch, Robert E., 4,059,355, Cl. 355-43.000.

Micromeritics Instrument Corporation: *See*—
Ball, Dean M.; and Hendrix, Warren P., 4,059,009, Cl. 73-61.10C.

Middelbeek, Cornelis Gerardus, to Ballast Nedam Groep N.V. Device for collecting light-weight substances floating on a liquid surface. 4,059,526, Cl. 210-242.00S.

Miessen, Ralf: *See*—
Wolf, Gerhard Dieter; Miessen, Ralf; Kunzel, Hans Egon; and Bentz, Francis, 4,059,403, Cl. 8-168.00B.

Mikhailovsky, Leonard Konstantinovich. Method of converting the electromagnetic spectrum carrier frequency and an electromagnetic energy receiver for same. 4,059,803, Cl. 325-445.000.

Mikhalev, Nikolai Alexandrovich; Shtarkman, Boris Petrovich; and Gladyshev, Jury Ivanovich. Device for preparing polymer articles from monomers. 4,059,374, Cl. 425-207.000.

Miles, Lyndon James; and Jones, Ivor Wynn, to Electricity Council, The. Production of beta-alumina ceramic articles and furnace therefor. 4,059,663, Cl. 264-65.000.

Miles, Oscar L. Turf growing apparatus. 4,058,930, Cl. 47-58.000.

Milkes, C. Paul, to American Communication Systems. Touchpad dialer for mobile telephones. 4,059,728, Cl. 179-2.00E.

Miller, Bernard; Martin, J. Ronald; Meiser, Charles H., Jr.; Lambert, Harold W.; and Buvel, Harry, to Textile Research Institute. Convective air flow dynamic calorimeter. 4,059,007, Cl. 73-190.00R.

Milliken Research Corporation: *See*—
McCollough, John K., 4,058,991, Cl. 68-205.00R.

Mills, John Alfred: *See*—
Molins, Desmond Walter; Mills, John Alfred; and Doerman, Eryk Stefan, 4,059,120, Cl. 131-23.00R.

Mills, Robert J.: *See*—
Alvarez, Joseph A.; and Mills, Robert J., 4,059,316, Cl. 308-8.200.

Milne, David John: *See*—
Holliday, Robin David; and Milne, David John, 4,059,673, Cl. 423-136.000.

Mindler, Fredric A.: *See*—
Hochreiter, William Thomas; Craig, Loren Jackson; and Mindler, Fredric A., 4,059,836, Cl. 354-29.000.

Minnesota Mining and Manufacturing Company: *See*—
Deering, Hartland W., Jr., 4,059,210, Cl. 225-47.000.
Pletcher, Wayne A., 4,059,715, Cl. 428-349.000.
Richards, Shirley T., 4,059,114, Cl. 128-287.000.

Mino, George M.; and Dustin, Donald L., to Bethlehem Steel Corporation. Partially alloyed galvanize product and method. 4,059,711, Cl. 427-310.000.

Mirtain, Henri J.; and Devienne, Andre M., to Uniroyal, S.A. Run-flat tire and hub therefor. 4,059,138, Cl. 152-330.0RF.

Mishima, Hiroshi; Ogiso, Akira; and Kobayashi, Shinsaku, to Sankyo Company Limited. Polyprenyl derivatives. 4,059,641, Cl. 260-635.00R.

Mishin, Konstantin Yakovlevich: *See*—
Alexandrov, Anatoly Julianovich; Grushko, July Sergeevich; Makarov, Evgeny Fredovich; Mishin, Konstantin Yakovlevich; and Baltrunas, Daljus Antanas Jono, 4,059,769, Cl. 250-493.000.

Misson, George W.: *See*—
Starr, Eugene W.; and Misson, George W., 4,059,427, Cl. 65-25.00A.

Misto-Gen Equipment Co.: *See*—
Holland, Charles M.; and Parrack, Lawrence W., 4,059,384, Cl. 425-577.000.

Mitchell, Donald K.: *See*—
Hood, Frederick E.; Mitchell, Donald K.; and Uhring, Gary S., 4,059,063, Cl. 114-106.000.

Mitchell, James T., to Westinghouse Electric Corporation. Interconnected module. 4,059,849, Cl. 361-395.000.

Mitchell, Wallace F., to Ammco Tools, Inc. Grinder attachment for a lathe. 4,058,937, Cl. 51-259.000.

Mitsubishi Gas Chemical Company, Inc.: *See*—
Yonemitsu, Eiichi; Isshiki, Tomiya; and Kijima, Yasuhiko, 4,059,582, Cl. 260-252.090.
Yoshizaki, Hiroyuki; Takanihashi, Hiromitsu; and Masuda, Yoshitaka, 4,059,565, Cl. 260-47.0XA.

Mitsubishi Jidosha Kogyo Kabushiki Kaisha: *See*—
Yamanaka, Akira, 4,059,304, Cl. 296-35.00R.

Mitsubishi Petrochemical Co., Ltd.: *See*—
Takematsu, Tetsuo; Konnai, Makoto; Takeda, Makoto; Fuga, Nobuhiko; Ikeda, Kaoru; and Shugaya, Kiyoshi, 4,059,431, Cl. 71-87.000.

Takematsu, Tetsuo; Konnai, Makoto; Takeda, Makoto; Fuga, Nobuhiko; Ikeda, Kaoru; and Shugaya, Kiyoshi, 4,059,432, Cl. 71-87.000.
Yamaguchi, Yoshinobu; Kitano, Nanahiko; Watanabe, Yoshihisa; and Imanari, Makoto, 4,059,544, Cl. 252-471.000.
Mitsubishi Rayon Co., Ltd.: *See*—
Kakihana, Hidetake; and Miyamatsu, Tokuhisa, 4,059,670, Cl. 423-7.000.
Musha, Morito; Sawa, Tomizo; and Kato, Osami, 4,059,511, Cl. 210-23.00R.
Mixon, James Lenhart, Jr., to AMP Incorporated. Electrical connector. 4,059,333, Cl. 339-247.000.
Miyamatsu, Tokuhisa: *See*—
Kakihana, Hidetake; and Miyamatsu, Tokuhisa, 4,059,670, Cl. 423-7.000.
Miyashiro, Shigeyoshi: *See*—
Nakamura, Junji; Miyashiro, Shigeyoshi; Hirose, Yoshio; and Awao, Takeyoshi, 4,059,572, Cl. 260-112.00R.
Mizutani, Masumi; Hata, Hiromichi; and Shimazaki, Masasuke, to Showa Industries Co., Ltd.; Fujisoku Electric Co., Ltd.; and Kitoku Co., Ltd. Liquid quality-evaluating apparatus. 4,059,006, Cl. 73-17.00A.
Mobay Chemical Corporation: *See*—
Smith, Donovan Norman, Jr., 4,059,634, Cl. 260-593.00R.
Moberg, Sigurd Manfred; and Lundberg, George A., to E. J. Brooks Company. Seal. 4,059,300, Cl. 292-322.000.
Mobil Oil Corporation: *See*—
Clark, Robert L.; and Dahan, Paul C., 4,059,065, Cl. 114-256.000.
Derr, Walter R.; McClernon, Joseph R.; McGovern, Stephen J.; and Smith, Fritz A., 4,059,648, Cl. 260-676.00R.
Eisenhardt, Frank B.; and Muehlberger, Stanislaus F., 4,059,509, Cl. 209-166.000.
Jones, John P., Jr., 4,059,202, Cl. 220-325.000.
Mochizuki, Koichi; and Hiragaki, Shigeho, to Japan Spectroscopic Co., Ltd. Column for use in high speed liquid chromatography. 4,059,523, Cl. 210-198.00C.
Modular Products Corporations (Labelmaster Division): *See*—
Fund, Harry, 4,058,918, Cl. 40-129.00C.
Mohr, Harvey O., to HydroTech International, Inc. Pressure balanced safety pipeline connector. 4,059,288, Cl. 285-2.000.
Moisar, Erik: *See*—
Vanassche, Willy Joseph; Pattyn, Herman Alberik; Moisar, Erik; and Klotzer, Sieghart, 4,059,450, Cl. 96-101.000.
Molins, Desmond Walter; Mills, John Alfred; and Doerman, Eryk Stefan, to Molins Limited. Manufacture of cigarettes. 4,059,120, Cl. 131-23.00R.
Molins Limited: *See*—
Molins, Desmond Walter; Mills, John Alfred; and Doerman, Eryk Stefan, 4,059,120, Cl. 131-23.00R.
Molins Machine Company Inc.: *See*—
Coburn, Robert E., 4,059,474, Cl. 156-356.000.
Mollere, John C., to Hercules Incorporated. Detector assembly for seismic marine survey. 4,059,819, Cl. 340-8.0LF.
Moltrecht, Reinhold. Telephone number register. 4,058,920, Cl. 40-336.000.
Monarch Marking Systems, Inc.: *See*—
Hamisch, Paul H., Jr., 4,059,476, Cl. 156-384.000.
Mongeau, Roland E., to Tower Manufacturing Corporation. Multi-position switch assembly having plural operator with primary and secondary detented cams. 4,059,738, Cl. 200-6.00B.
Monsanto Company: *See*—
Bittle, David F.; and McPeters, Arnold L., 4,059,668, Cl. 264-290.00R.
Ruest, Dennis A.; Kidwell, Roger L.; and Shen, Chung Y., 4,059,579, Cl. 544-172.000.
Tolbert, William R.; and Feder, Joseph, 4,059,485, Cl. 195-1.800.
Tolbert, William R., 4,059,486, Cl. 195-1.800.
Mont, Walter. Topical liquid or ointment. 4,059,690, Cl. 424-150.000.
Montabert, Roger. Hollow percussion drill rod with seal for cleaning fluid inlet tube. 4,059,279, Cl. 277-166.000.
Montclair Research Corporation: *See*—
Grossman, Harold, 4,059,119, Cl. 131-9.000.
Montecatini Edison S.p.A.: *See*—
Pinamonti, Franco; and Maccone, Sergio, 4,059,698, Cl. 424-211.000.
Moore, Arnold Robert: *See*—
Smith, Roland Wright; and Moore, Arnold Robert, 4,059,707, Cl. 427-35.000.
Moore, Charles H. Process for producing heavy-duty high-pressure ferrous metal cup-shaped products having a cylindrical barrel. 4,059,003, Cl. 72-256.000.
Moore, Joseph E., to Chevron Research Company. Certain 4-halo-5-aryl-1,2,3-dithiazole compounds and their preparation. 4,059,590, Cl. 260-306.80R.
Moore, Prentice G.: *See*—
Dierker, Jeffrey A.; and Moore, Prentice G., 4,059,798, Cl. 324-127.000.
Moore, Roland E. Dental aspirator tip. 4,058,896, Cl. 32-33.000.
Moorhouse, Stephen; Horsfall, Harry; and Dean, Alan Rangeley, to David Brown Tractors Limited. Agricultural tractor with draft load sensing springs for power lift control. 4,059,159, Cl. 172-7.000.
Mordkovich, Andrei Efremovich: *See*—
Barannik, Ivan Andreevich; Kondratenko, Anatoly Borisovich; Trukhin, Alexandr Fedorovich; Raskatov, Viktor Georgievich; Zharovsky, Ivan Vasilievich; Rudakov, Viktor Alexandrovich; Mordkovich, Andrei Efremovich; and Chalov, Alexandr Vasilievich, 4,059,372, Cl. 425-8.000.
Mordwinkin, George, to Sensor Corporation. Digital eddy current apparatus for sensing and analyzing metallurgical characteristics of an electrically conductive material. 4,059,795, Cl. 324-233.000.
Morgan, Horace P.: *See*—
Gambs, Gerard C.; and Morgan, Horace P., 4,059,060, Cl. 110-1.00J.
Morita, Akiyoshi; Hayasaka, Tamio; Shimizu, Kunio; and Fukuda, Tokiharu, to Toyota Jidosha Kogyo Kabushiki Kaisha. Method of and a means for pouring molten metal in a die casting device. 4,059,143, Cl. 164-113.000.
Morland, Richard Harlon, to Illinois Tool Works Inc. Screw shank slotting mechanism. 4,058,864, Cl. 10-2.000.
Morokawa, Shigeru: *See*—
Tamaru, Munetaka; Kume, Kazunari; Oono, Hideshi; Watanabe, Minoru; Sato, Hideo; and Morokawa, Shigeru, 4,058,969, Cl. 58-23.0BA.
Morris, Earl Lavern; and Fields, Larry, to Acorn Engineering Company. Waste drain connection. 4,059,289, Cl. 285-56.000.
Morro, William Charles; Hakka, Leo Ernest; Brophy, James Mackay; Hebrard, Michel Jacques Roger; and Courtes, Jean Claude, to Union Carbide Canada Limited. Hydrocarbon/silicon oil lubricating compositions for low temperature use. 4,059,534, Cl. 252-32.70E.
Morse, Henry W.: *See*—
McGahan, Wallace A.; Webb, Paul D.; and Morse, Henry W., 4,059,368, Cl. 417-243.000.
Morton-Norwich Products, Inc.: *See*—
Pelosi, Stanford S.; White, Ronald E.; Wright, George C.; and Yu, Chia Nien, 4,059,597, Cl. 260-347.700.
Moss, Robert J.; and Hurst, Forrest G. Grass cutting blades. 4,058,959, Cl. 56-295.000.
Motoren- und Turbinen-Union Friedrichshafen GmbH: *See*—
Rudert, Wolfgang, 4,059,080, Cl. 123-41.330.
Motter, Theodore J.: *See*—
Mattimoe, Paul T.; Motter, Theodore J.; Hofmann, John J.; and Herliczek, Siegfried H., 4,059,469, Cl. 156-108.000.
Movshovich, Pavel Mikhailovich; Khavkin, Viktor Pavlovich; Maximov, Gennady Konstantinovich; Babushkina, Natalya Borisovna; Baranov, Alexandr Anatolievich; Ivanov, Lev Nikolaevich; Nezelenov, Sergei Vladimirovich; Shutov, Gennady Nikolaevich; Tsygulev, Leonid Nikiforovich; and Ilin, Vadim Sergeevich. Distributing device for supplying compressed air to chambers of apparatus for making self-twisted product. 4,058,960, Cl. 57-34.0AT.
Muckelrath, Ernest R., to Tioga Air Heaters, Co. Metal fence post and method of making. 4,058,882, Cl. 29-407.000.
Muehlberger, Stanislaus F.: *See*—
Eisenhardt, Frank B.; and Muehlberger, Stanislaus F., 4,059,509, Cl. 209-166.000.
Mullen, Daniel J.: *See*—
Eddy, Wesley L.; Mullen, Daniel J.; and Bonham, Arthur R., 4,059,729, Cl. 179-15.0BF.
Muller, Heinz, to Hoechst Aktiengesellschaft. Process for the work-up of a contaminated inactive mercury(II)chloride/active carbon-catalyst. 4,059,438, Cl. 75-81.000.
Mullner, Franz, to Steyr-Daimler-Puch Aktiengesellschaft. Pretriggerable trigger mechanism for sporting rifles. 4,058,924, Cl. 42-69.00R.
Mumford, George V., to Owens-Illinois, Inc. Vapor-seal safety cap and container. 4,059,198, Cl. 215-222.000.
Murakami, Kazumasa; and Natori, Takashi, to Nippon Crucible Co., Ltd. Method of making immersion nozzle and long stopper for continuous casting of steel. 4,059,662, Cl. 264-62.000.
Murakami, Yuetsu: *See*—
Masumoto, Hakaru; Murakami, Yuetsu; and Nakamura, Naoji, 4,059,462, Cl. 148-31.550.
Murao, Sawao: *See*—
Nishino, Toyokazu; Hamagishi, Yasutaro; Oki, Toshikazu; and Murao, Sawao, 4,059,487, Cl. 195-28.00N.
Murdock, David M., to Stanford Research Institute. Flexible ultrasound coupling system. 4,059,098, Cl. 128-2.00V.
Murphy, John A. Georadiological surveying for oil and gas and subsurface structure contour mapping. 4,059,760, Cl. 250-253.000.
Musha, Morito; Sawa, Tomizo; and Kato, Osami, to Mitsubishi Rayon Co., Ltd. Method for clarifying waste water containing finely divided oily materials. 4,059,511, Cl. 210-23.00R.
Nacey, Michael: *See*—
Watters, Bill G.; Nacey, Michael; and Horrall, Thomas R., 4,059,726, Cl. 179-1.50M.
Nachbur, Hermann; and Rohringer, Peter, to Ciba-Geigy Corporation. Phosphorus-containing reaction products useful as flameproofing agents. 4,059,532, Cl. 252-8.100.
Nagano, Katsusuke, to Dai Nippon Insatsu Kabushiki Kaisha. Method of making an intaglio halftone gravure printing plate. 4,059,481, Cl. 156-660.000.
Nagumo, Fumio: *See*—
Yamanaka, Seisuke; and Nagumo, Fumio, 4,059,839, Cl. 358-44.000.
Naka, Hiromitsu. Flexible non-skid strip with fluorescent surface portions. 4,058,942, Cl. 52-179.000.
Nakai, Shiro; and Nakamura, Minoru, to Glory Kogyo Kabushiki Kaisha. Coin stack supporting device in coin wrapping machine. 4,058,955, Cl. 53-212.000.
Nakaizumi, Yasushi; Ueno, Yukichi; and Okumura, Masahide, to Hitachi, Ltd. Field emission apparatus. 4,059,783, Cl. 315-107.000.
Nakamura, Junji; Miyashiro, Shigeyoshi; Hirose, Yoshio; and Awao, Takeyoshi, to Ajinomoto Co., Inc. Mucopolysaccharide having

flocculating activity of protein and method for producing the same. 4,059,572, Cl. 260-112.00R.
Nakamura, Masaya, to Kabushiki Kaisha Nakamura Seisakusho. Game machine. 4,059,266, Cl. 273-1.00E.
Nakamura, Minoru: *See*—
Nakai, Shiro; and Nakamura, Minoru, 4,058,955, Cl. 53-212.000.
Nakamura, Naoji: *See*—
Masumoto, Hakaru; Murakami, Yuetsu; and Nakamura, Naoji, 4,059,462, Cl. 148-31.550.
Nakamura, Yasuharu: *See*—
Sugiyama, Masatoshi; Kato, Eiichi; and Nakamura, Yasuharu, 4,059,448, Cl. 96-84.00A.
Nakamura, Yasusi; Umemura, Masashi; and Yonekura, Michimasa, to Asahi Denka Kogyo K.K. Fluorine-containing dicarbamate esters. 4,059,613, Cl. 560-26.000.
Nakano, Takashi: *See*—
Kitamura, Takashi; Watanabe, Asao; Nakano, Takashi; Masaki, Katsumi; Hirayama, Kazuhiro; Sato, Yasushi; and Tokiwa, Taisuke, 4,059,833, Cl. 346-108.000.
Nakasu, Makoto: *See*—
Tohyama, Masao; Ichigo, Minoru; Suzuki, Takeshi; Nakasu, Makoto; Ando, Akinobu; Yoshida, Akitoshi; Kosaka, Masaharu; Hayasi, Norihisa; and Inoue, Shigeki, 4,059,553, Cl. 260-29.60S.
Narang, Saran A.; and Stawinski, Jacek, to Canadian Patents and Development Limited. Arylsulfonyl tetrazoles. 4,059,592, Cl. 260-308.00D.
Narco Scientific Industries, Inc.: *See*—
Jernigan, Marvin E., 4,059,348, Cl. 351-30.000.
Nash, Charles A. Switch controlled power receptacle system. 4,059,773, Cl. 307-115.000.
Nash, John E., to Star Dental Manufacturing Co., Inc. Dental burr. 4,058,898, Cl. 32-59.000.
National Distillers and Chemical Corporation: *See*—
Goetz, Richard W., 4,059,640, Cl. 260-635.00R.
National Research Development Corporation: *See*—
Devas, Michael Bertrand, 4,059,102, Cl. 128-92.00B.
Fawcett, John Neville; and Nicol, Stuart William, 4,059,022, Cl. 74-226.000.
Mansfield, Wilfred Percival; and Priede, Theodor, 4,059,085, Cl. 123-195.00R.
National-Standard Company: *See*—
Lang, Ernest U., 4,059,177, Cl. 192-41.00S.
Natori, Takashi: *See*—
Murakami, Kazumasa; and Natori, Takashi, 4,059,662, Cl. 264-62.000.
Natsuume, Tadao: *See*—
Goto, Kuniaki; Asai, Harumi; and Natsuume, Tadao, 4,059,563, Cl. 260-45.95H.
NCR Corporation: *See*—
Betts, William L., 4,059,735, Cl. 179-18.0BC.
Nutter, Roy S., Jr.; Washburn, Jerry R.; and Verwys, John H., 4,059,851, Cl. 364-200.000.
Stewart, John W., 4,059,844, Cl. 361-152.000.
Nederlandsche Organisatie Voor Toegepast-Natuurwetenschappelijk Onderzoek Ten Behoeve Van Nijverheid: *See*—
Feis, Nikolaas, 4,059,129, Cl. 138-37.000.
Nelson McCoy Pottery Company: *See*—
Wheeler, Howard R., 4,058,869, Cl. 15-101.000.
Nelson, Peter H.; and Untch, Karl G., to Syntex (U.S.A.) Inc. Oxidative process for the preparation of 2-(5H-Dibenzo[a,d]cyclohepten-5-on-2-yl)acetic, propionic and butyric acid. 4,059,611, Cl. 260-456.00P.
Nesslage, Donald John; Yu, Lin Sheng; and Shaw, Michael Francis, to Phelps Dodge Industries, Inc. Oxygen-free copper product and process. 4,059,437, Cl. 75-76.000.
Netlon Limited: *See*—
Mercer, Frank Brian, 4,059,713, Cl. 428-36.000.
Neu, Ernest L., to Grefco, Inc. Method and apparatus for selectively comminuting particles of a frangible material. 4,059,231, Cl. 241-5.000.
Neufeldt, Jacob J. Vehicle tailgate assembly. 4,059,307, Cl. 298-23.00R.
Neukam, Theo; Reinehr, Ulrich; Bentz, Francis; and Nischk, Gunther, to Bayer Aktiengesellschaft. Spinnable solutions containing crosslinkable copolymers of acrylonitrile and n-methylol alkyl ether acrylamides. 4,059,556, Cl. 260-30.200.
Nezelenov, Sergei Vladimirovich: *See*—
Movshovich, Pavel Mikhailovich; Khavkin, Viktor Pavlovich; Maximov, Gennady Konstantinovich; Babushkina, Natalya Borisovna; Baranov, Alexandr Anatolievich; Ivanov, Lev Nikolaevich; Nezelenov, Sergei Vladimirovich; Shutov, Gennady Nikolaevich; Tsygulev, Leonid Nikiforovich; and Ilin, Vadim Sergeevich, 4,058,960, Cl. 57-34.0AT.
Nicholls, Joseph A. Traffic signal controller flasher for pedestrian clearance. 4,059,821, Cl. 340-44.000.
Nicholson, Floyd A.: *See*—
Martin, Clyde J.; and Nicholson, Floyd A., 4,059,823, Cl. 340-58.000.
Nickel, Hubertus: *See*—
Luhleich, Hartmut; Nickel, Hubertus; and Dias, Francesco, 4,059,682, Cl. 423-448.000.
Nickerson, Malcolm Horace, to B. F. Goodrich Company, The. Solar actuated siphon drain. 4,059,126, Cl. 137-142.000.
Nickey, George Allen: *See*—
Heckman, Russell William; and Nickey, George Allen, 4,059,400, Cl. 432-124.000.
Nicol, Stuart William: *See*—
Fawcett, John Neville; and Nicol, Stuart William, 4,059,022, Cl. 74-226.000.
Nicolas, Jean; Lagrange, Alain; and Hildebrandt, Nieczyslaw, to Thomson-CSF. Method of manufacturing ferrimagnetic material for recording, read out and erase heads utilized in magnetic layer devices. 4,059,664, Cl. 264-66.000.
Nielsen, Anker J., Jr. Barrel type lock and key. 4,058,992, Cl. 70-34.000.
Nilson, Eric L.: *See*—
Polley, Richard D.; Nilson, Eric L.; Constantakis, Roberto; and Pruitt, Donovan E., 4,059,522, Cl. 210-198.00R.
Nims, Jerry Curtis: *See*—
Lo, Allen Kwok Wah; and Nims, Jerry Curtis, 4,059,354, Cl. 355-22.000.
Ninomiya, Hiroshi: *See*—
Tanaka, Wataru; Akito, Eiichiro; Yoshida, Koichi; Terada, Takashi; and Ninomiya, Hiroshi, 4,059,686, Cl. 424-19.000.
Nippon Crucible Co., Ltd.: *See*—
Murakami, Kazumasa; and Natori, Takashi, 4,059,662, Cl. 264-62.000.
Nippon Electric Company, Ltd.: *See*—
Sakoe, Hiroaki, 4,059,725, Cl. 179-1.50D.
Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha: *See*—
Takida, Hiroshi; Kido, Akio; and Takahashi, Masazumi, 4,058,904, Cl. 34-12.000.
Nippon Kayaku Kabushiki Kaisha: *See*—
Tanaka, Wataru; Akito, Eiichiro; Yoshida, Koichi; Terada, Takashi; and Ninomiya, Hiroshi, 4,059,686, Cl. 424-19.000.
Nippon Oil Company Ltd.: *See*—
Imai, Hirosuke; and Ito, Hiroyuki, 4,059,555, Cl. 260-29.70H.
Nippon Soken, Inc.: *See*—
Toshioka, Toru; Oishi, Kazuo; and Yamada, Takashi, 4,059,822, Cl. 340-52.00H.
Nippon Steel Corporation: *See*—
Takemura, Susumu; Onoyama, Masao; and Tsuji, Masanobu, 4,059,440, Cl. 75-126.00C.
Nippon Zeon Co. Ltd.: *See*—
Goto, Kuniaki; Asai, Harumi; and Natsuume, Tadao, 4,059,563, Cl. 260-45.95H.
Nippondenso Co., Ltd.: *See*—
Kasima, Osamu; and Sanda, Shougo, 4,059,079, Cl. 123-30.00D.
Nischk, Gunther: *See*—
Neukam, Theo; Reinehr, Ulrich; Bentz, Francis; and Nischk, Gunther, 4,059,556, Cl. 260-30.200.
Nishibata, Atsushi: *See*—
Handa, Susumu; Tanaka, Yoshiaki; Nishibata, Atsushi; Ueda, Sadashi; Inamoto, Yoshiaki; Saito, Masahiro; Tanimoto, Fumio; and Kitano, Hisao, 4,059,610, Cl. 544-193.000.
Nishijima, Masanori; Oda, Nobuyuki; and Terada, Haruyoshi, to Oxy Metal Industries Corporation. Metal surface treatment. 4,059,452, Cl. 106-14.000.
Nishikawa, Mikio: *See*—
Hori, Kikuo; Horiuchi, Takumi; Nishikawa, Mikio; Ryugo, Shiro; Ishizuka, Akira; and Takenaka, Yoshisuke, 4,059,239, Cl. 242-18.100.
Nishimoto, Kichinosuke; and Nishimura, Seiichiro, to Bridgestone Tire Company Limited. Tire finishing apparatus. 4,059,139, Cl. 157-13.000.
Nishimura, Seiichiro: *See*—
Nishimoto, Kichinosuke; and Nishimura, Seiichiro, 4,059,139, Cl. 157-13.000.
Nishino, Toyokazu; Hamagishi, Yasutaro; Oki, Toshikazu; and Murao, Sawao, to Sanraku-Ocean Co., Ltd. Purine nucleoside 5'-phosphate(-mono, di or tri)3'(2')-diphosphates and processes for their preparation. 4,059,487, Cl. 195-28.00N.
Nishiyama, Keizo; Maeda, Sadao; and Iwata, Kohshi, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho; and Kabushiki Kaisha Maeda Shell Service. Process for plating shaped articles made of synthetic resins. 4,059,710, Cl. 427-307.000.
Nissan Kagaku Kogyo Kabushiki Kaisha: *See*—
Tohyama, Masao; Ichigo, Minoru; Suzuki, Takeshi; Nakasu, Makoto; Ando, Akinobu; Yoshida, Akitoshi; Kosaka, Masaharu; Hayasi, Norihisa; and Inoue, Shigeki, 4,059,553, Cl. 260-29.60S.
Nissan Motor Co., Ltd.: *See*—
Kosaka, Katuaki; and Ueno, Zene, 4,059,076, Cl. 123-3.000.
Kosaka, Katuaki; Wagatsuma, Fumio; Shimomoto, Mithuo; Harada, Osamu; and Ueno, Zene, 4,059,415, Cl. 48-63.000.
Nix, George J.; Barrington, Burchus Q.; Farley, David L.; and Hortman, Norman G., to Halliburton Company. Weight and pressure operated well testing apparatus and its method of operation. 4,059,153, Cl. 166-264.000.
Noble, Howard E. Follow through indicator for bowlers. 4,059,267, Cl. 273-54.00B.
Nobuo, Yoshimori. Classifying apparatus for particulate materials. 4,059,507, Cl. 209-139.00A.
Nolan, James J.: *See*—
Markowski, Stanley J.; and Nolan, James J., 4,058,977, Cl. 60-39.650.
Noranda Mines Limited: *See*—
Kitzinger, Frank; and Rosenblum, Frank, 4,059,016, Cl. 73-304.00R.
Nordson Corporation: *See*—
Scholl, Charles H.; Janner, John R., Jr.; Stumphauzer, William C.; and Shuster, Duane O., 4,059,466, Cl. 156-78.000.
Scholl, Charles H.; Janner, John R., Jr.; and Stumphauzer, William C., 4,059,714, Cl. 428-310.000.

Norprint Limited: *See*—
Wright, Maurice J., 4,059,203, Cl. 221-73.000.

North American Philips Corporation: *See*—
Madsen, Elmer W.; and Soden, George B., 4,059,024, Cl. 74-421.00R.

Northwestern University: *See*—
Epstein, Max, 4,059,831, Cl. 343-6.80R.

Northwood Pulp and Timber Limited: *See*—
Kahlert, George; Pommer, Lawrence; Davis, John; and Whebell, Bert, 4,059,061, Cl. 110-7.00A.

Norton Company: *See*—
Kiovsky, Joseph R.; and Koradia, Pramad B., 4,059,543, Cl. 252-455.00Z.

Norton, Ted R.; Shibata, Shoji; and Kashiwagi, Midori, to University of Hawaii, The. Cardiotonic agent. 4,059,694, Cl. 424-177.000.

Nubani, Jawdat Ibrahim; and Rysz, Walter Robert, to RCA Corporation. Method of assembling a mask-panel assembly of a shadow-mask cathode-ray tube. 4,058,875, Cl. 29-25.150.

Nutter, Roy S., Jr.; Washburn, Jerry R.; and Verwys, John H., to NCR Corporation. Priority network for devices coupled by a common bus. 4,059,851, Cl. 364-200.000.

Nylund, Ragnar: *See*—
Kankaanpaa, Matti; Nylund, Ragnar; and Reijonen, Yrjo, 4,059,482, Cl. 162-281.000.

Oakland Corporation, The: *See*—
Wallace, Richard B., 4,059,136, Cl. 151-14.500.

Obayashi, Nobuharu; Hashizume, Hikaru; Sakashita, Noriji; Kameyama, Seiji; Ezawa, Sadaaki; Kugisawa, Toshio; Washiyama, Yutaka; Kondo, Tatsunori; and Watanabe, Hironori, to Kabushiki Kaisha Kawai Gakki Seisakusho. Tone-source apparatus for electronic musical instrument. 4,059,040, Cl. 84-1.030.

Oceanic Contractors Inc.: *See*—
Gerbault, Marcel; and Gair, Robert, 4,058,987, Cl. 61-86.000.

O'Connell, Donald L., to Floral Innovations, Inc. Holder for a foam block for supporting flower arrangements. 4,058,929, Cl. 47-41.120.

Oda, Nobuyuki: *See*—
Nishijima, Masanori; Oda, Nobuyuki; and Terada, Haruyoshi, 4,059,452, Cl. 106-14.000.

Office National d'Etudes et de Recherches Aerospatiales: *See*—
Gay, Michel J. L., 4,059,797, Cl. 324-60.00C.

Ogiso, Akira: *See*—
Mishima, Hiroshi; Ogiso, Akira; and Kobayashi, Shinsaku, 4,059,641, Cl. 260-635.00R.

Ohio University: *See*—
Clearfield, Abraham, 4,059,679, Cl. 423-306.000.

Ohlinger, Manfred: *See*—
Kopke, Helmut; Ohlinger, Manfred; Grau, Werner; Schoenafinger, Eduard; and Schneehage, Hans Henning, 4,059,716, Cl. 428-403.000.

Ohlson, John Leonard: *See*—
Gaudette, Roger Robert; Ohlson, John Leonard; and Scanlon, Patricia Marie, 4,059,548, Cl. 260-251.00R.

Ohsawa, Mitsuo; Yamatani, Wataru; and Onoe, Yukio, to Sony Corporation. Input level display circuit for receivers. 4,059,802, Cl. 325-398.000.

Oishi, Kazuo: *See*—
Toshioka, Toru; Oishi, Kazuo; and Yamada, Takashi, 4,059,822, Cl. 340-52.00H.

Oita, Masahiro; Hirohata, Hyogo; and Hamasaki, Nobuhiro, to Matsushita Electric Industrial Co., Ltd. Electroless copper plating solution. 4,059,451, Cl. 106-1.260.

Okabe, Hiromichi: *See*—
Hosaka, Hirokazu; Tanimoto, Kenji; Okabe, Hiromichi; Tanaka, Kunthiko; Ueda, Yuji; and Dohgane, Iwao, 4,059,637, Cl. 260-610.00A.

Okami, Takehide, to Shin-Etsu Chemical Company Limited. Primer compositions. 4,059,473, Cl. 156-308.000.

O'Kane, Daniel Francis: *See*—
Gulitz, Louis; Kwap, Theodore William; Lisle, Walter Irving; O'Kane, Daniel Francis; and Poponiak, Michael Robert, 4,059,385, Cl. 431-12.000.

Oki, Toshikazu: *See*—
Nishino, Toyokazu; Hamagishi, Yasutaro; Oki, Toshikazu; and Murao, Sawao, 4,059,487, Cl. 195-28.00N.

Okuda, Itsuki: *See*—
Sugiyama, Hironari; Chiyomaru, Isao; Okuda, Itsuki; Yamamoto, Hisaaki; and Ito, Hideo, 4,059,635, Cl. 260-609.00E.

Okumura, Koji, to Xerox Corporation. Electrical information storage system. 4,059,443, Cl. 96-1.0PS.

Okumura, Masahide: *See*—
Nakaizumi, Yasushi; Ueno, Yukichi; and Okumura, Masahide, 4,059,783, Cl. 315-107.000.

Olin, Gerard: *See*—
Aimar, Jean Louis; and Olin, Gerard, 4,059,787, Cl. 318-568.000.

Ollinger, Janet, to Rohm and Haas Company. N-(Substituted)aminocarbonyl O,S-dialkyl phosphoramido(di)thioates and method of controlling arthropods. 4,059,697, Cl. 424-211.000.

Olschewski, Armin: *See*—
Ernst, Horst Manfred; Olschewski, Armin; Schurger, Rainer; Walter, Lothar; Brandenstein, Manfred; and Burkl, Erich, 4,059,179, Cl. 192-98.000.

Olson, Gregory J.; and Chapman, Wayne A., to Packaging Corporation of America. Shipping container and blank therefor. 4,059,221, Cl. 229-39.00R.

Olson, Leonard J. Self-cleaning non-return drainage valve. 4,059,127, Cl. 137-244.000.

Olympus Optical Co., Ltd.: *See*—
Tojyo, Tsutomu, 4,059,342, Cl. 350-175.0ML.
Yamasita, Nobuo, 4,059,344, Cl. 350-220.000.

Omnimed, Inc.: *See*—
Cutruzzula, Jeffrey F.; and Schattner, Robert L., 4,059,105, Cl. 128-133.000.

Omura, Shinichi: *See*—
Hosokoshi, Kakuichiro; Yamamoto, Hikoshi; Tanaka, Masayuki; and Omura, Shinichi, 4,059,834, Cl. 354-1.000.

Onoe, Yukio: *See*—
Ohsawa, Mitsuo; Yamatani, Wataru; and Onoe, Yukio, 4,059,802, Cl. 325-398.000.

Onoyama, Masao: *See*—
Takemura, Susumu; Onoyama, Masao; and Tsuji, Masanobu, 4,059,440, Cl. 75-126.00C.

Oono, Hideshi: *See*—
Tamaru, Munetaka; Kume, Kazunari; Oono, Hideshi; Watanabe, Minoru; Sato, Hideo; and Morokawa, Shigeru, 4,058,969, Cl. 58-23.0BA.

Oronzio de Nora Impianti Elettrochimici S.p.A.: *See*—
de Nora, Oronzio; and de Nora, Vittorio, 4,059,495, Cl. 204-98.000.

Osborne, Thomas E.: *See*—
Dickinson, Peter D.; Osborne, Thomas E.; Rode, France; and Baum, Allen J., 4,059,750, Cl. 364-715.000.

Osteen, Mitchell M.: *See*—
Tart, David K.; and Osteen, Mitchell M., 4,059,753, Cl. 362-267.000.

Oswald, Alexis A., to Exxon Research & Engineering Co. Polythioether polyurethanes and their preparation. 4,059,570, Cl. 260-77.5AP.

Otsuka Kagaku Yakuhin Kabushiki Kaishi: *See*—
Shono, Tatsuya; and Matsumura, Yoshihiro, 4,059,595, Cl. 260-345.90R.

Otto, Heinz; and Ilsemann, Bernhard, to Volkswagenwerk Aktiengesellschaft. Wheel suspension for motor vehicles. 4,059,286, Cl. 280-673.000.

Ouelette, Ronald J.; Canney, Robert S.; and Stetson, Ralph B., to General Electric Company. Dry-type instrument transformer with potential tap and connector therefor. 4,059,326, Cl. 339-113.00R.

Outboard Marine Corporation: *See*—
Roseberry, Ward A., 4,058,957, Cl. 56-11.300.
Sheldon, John D., 4,059,371, Cl. 418-61.00A.
Waskiewicz, John J.; and Winston, John H., 4,059,310, Cl. 302-42.000.

Overlach, Knud: *See*—
Pietzsch, Ludwig; and Overlach, Knud, 4,059,012, Cl. 73-141.00A.

Overway, Roy E.: *See*—
Saylor, Lee H.; and Overway, Roy E., 4,059,278, Cl. 277-139.000.

Owen, Alfred B.; and Gifford, Bruce M., to Lamons Metal Gasket Company. Circular double-jacketed gasket with single joint. 4,059,215, Cl. 228-173.00C.

Owens-Corning Fiberglas Corporation: *See*—
Benson, Gustav E., 4,058,968, Cl. 57-140.00R.

Owens-Illinois, Inc.: *See*—
Heckman, Russell William; and Nickey, George Allen, 4,059,400, Cl. 432-124.000.
Mumford, George V., 4,059,198, Cl. 215-222.000.
Thomas, Ian M., 4,059,669, Cl. 264-319.000.

Oxy Metal Industries Corporation: *See*—
Nishijima, Masanori; Oda, Nobuyuki; and Terada, Haruyoshi, 4,059,452, Cl. 106-14.000.

Oy Keskuslaboratorio - Centrallaboratorium, Ab: *See*—
Mannstrom, Bo Knut, 4,059,237, Cl. 241-246.000.

Pacansky, Thomas John, to Xerox Corporation. Stabilized emulsion inks. 4,059,554, Cl. 260-29.6WQ.

Packaging Corporation of America: *See*—
Olson, Gregory J.; and Chapman, Wayne A., 4,059,221, Cl. 229-39.00R.

Pagnozzi, Vincenzo, to Ernesto Guglielmo Pagnozzi. Process for drying large pieces of wood at subatmospheric pressure or in vacuo, particularly for drying delicate wood and/or wood which is easily split. 4,058,906, Cl. 34-16.500.

Pakosh, Daniel. Reversible seat and steering console for tractors. 4,059,171, Cl. 180-77.00S.

Paletto, Raimondo, to SGS-ATES Componenti Elettronici SpA. Resin-encased microelectronic module. 4,059,810, Cl. 330-65.000.

Pallas, Spiros George: *See*—
Runge, Thomas M.; Burkhalter, John E.; and Pallas, Spiros George, 4,058,857, Cl. 3-1.700.

Palmer, Sherwin. Loading rack for minicomputer. 4,059,256, Cl. 270-52.000.

Pangonis, William James, to Du Pont de Nemours, E. I., and Company. Biaxially oriented polyethylene terephthalate film and method of making such film. 4,059,667, Cl. 264-289.000.

Panourgias, Constantin George, to Hellenic Plastics and Rubber Industry. Quick-action coupling for pipes or tubes. 4,059,296, Cl. 285-312.000.

Parc, Guy: *See*—
Lallement, Jacques; Parc, Guy; and de Gaudemaris, Gabriel, 4,059,536, Cl. 252-33.300.

Parent, Richard A.: *See*—
Lu, Chin H.; and Parent, Richard A., 4,059,444, Cl. 96-1.0LY.

Parker-Hannifin Corporation: *See*—
Grahl, Darwin R.; and Haramoto, Cary, 4,059,297, Cl. 285-340.000.

Parker, Kathlyn A.; and Kosley, Raymond W., Jr., to Research Corpo-

ration. Process for the preparation of 17(20)ene-21-steroid aldehydes. 4,059,575, Cl. 260-239.500.
Parrack, Lawrence W.: *See*—
Holland, Charles M.; and Parrack, Lawrence W., 4,059,384, Cl. 425-577.000.
Pattyn, Herman Alberik: *See*—
Vanassche, Willy Joseph; Pattyn, Herman Alberik; Moisar, Erik; and Klotzer, Sieghart, 4,059,450, Cl. 96-101.000.
Paulson, John Walter: *See*—
Bredland, Alf Marlov; Fong, Walter Lee; Messing, Terry Glen; and Paulson, John Walter, 4,059,717, Cl. 429-162.000.
Paulucci, Jeno F.: *See*—
Zimmer, Elvis Simon; and Hassell, David Allen, 4,059,398, Cl. 432-121.000.
Payant, Noel M. Tape cassette phrase retriever. 4,059,244, Cl. 242-200.000.
Pearson, Durk J.; and Bohn, Jack R., to TRW Inc. Pressure swing recovery system for oil shale deposits. 4,059,308, Cl. 299-5.000.
Pechmeze, Jacques Pierre Edmond: *See*—
Foulletier, Louis; Pechmeze, Jacques Pierre Edmond; and Sureau, Robert Frederic Michel, 4,059,626, Cl. 260-578.000.
Pelosi, Stanford S.; White, Ronald E.; Wright, George C.; and Yu, Chia Nien, to Morton-Norwich Products, Inc. 1-[5-(2-Nitrophenyl)-2-furancarboximidoyl]-1H-hexahydroazepine hydrochloride. 4,059,597, Cl. 260-347.700.
Pennewiss, Horst: *See*—
Hitzler, Otto; Pennewiss, Horst; Froelich, August; Markert, Gerhard; and Wunderlich, Winfried, 4,059,574, Cl. 260-192.000.
Pennsylvania Pacific Corporation: *See*—
Carnwath, Joseph W., 4,059,057, Cl. 108-51.100.
Perevodchikov, Vladimir Innokentievich; Shapenko, Valentina Nikolaevna; Chernov, Zarem Sergeevich; and Bunina, Nina Sergeevna. Electron-beam converter. 4,059,784, Cl. 315-349.000.
Perkins, Robert W., to Spiral Tubing Corporation. Method of forming helically corrugated tubing. 4,059,004, Cl. 72-299.000.
Perold, Helmuth Conny, to Adjusting Tables Inc. Adjustable table for physical therapy. 4,059,255, Cl. 269-323.000.
Perry Industries, Inc.: *See*—
Champion, Robert J., 4,058,868, Cl. 15-4.000.
Personer Verkstad, AB: *See*—
Tillgren, Gunnar Kurt Arne, 4,059,049, Cl. 100-41.000.
Perucca, Giovanni; Melindo, Flavio; and De Vincentiis, Girolamo, to CSELT - Centro Studi e Laboratori Telecomunicazioni S.p.A. Dual testing system for supervising duplicated telecommunication equipment. 4,059,736, Cl. 179-175.20R.
Pescetto, James R., to L. R. Nelson Corporation. Traveling sprinkler guide wheel assembly. 4,059,229, Cl. 239-183.000.
Peterson, James A.: *See*—
Peterson, James H.; and Peterson, James A., 4,058,932, Cl. 49-177.000.
Peterson, James H.; and Peterson, James A. Mounting apparatus for swinging and sliding doors. 4,058,932, Cl. 49-177.000.
Petrow, Henry G.; and Allen, Robert J., to Prototech Company. Platinum colloid sol and method of forming same. 4,059,541, Cl. 252-313.00R.
Pfeifer, Wolf-Dieter: *See*—
Scherberich, Paul; and Pfeifer, Wolf-Dieter, 4,059,589, Cl. 260-306.70C.
Pfenninger, Hans, to BBC Brown Boveri & Company Limited. Combined gas/steam power plant with pressurized-gas generator. 4,058,974, Cl. 60-39.120.
Pfiffner, Albert: *See*—
Chodnekar, Madhukar Subraya; Pfiffner, Albert; Rigassi, Norbert; Schwieter, Ulrich; and Suchy, Milos, 4,059,600, Cl. 260-348.460.
Pfizer: *See*—
Kadin, Saul Bernard, 4,059,584, Cl. 260-268.0BC.
Phelps Dodge Industries, Inc.: *See*—
Nesslage, Donald John; Yu, Lin Sheng; and Shaw, Michael Francis, 4,059,437, Cl. 75-76.000.
Phillips, Alfred R.; and Logan, Arthur D., to Dayco Corporation. Hose having an electrically conductive layer for dissipating static electricity and method of making same. 4,059,847, Cl. 361-215.000.
Phillips, John J.; and Stephenson, Roger, to G & H Technology, Inc. Snap action breech lock connector. 4,059,332, Cl. 339-113.00R.
Phillips Petroleum Company: *See*—
Chapman, Charles C.; and Hann, Paul D., 4,059,649, Cl. 260-683.480.
Childs, William V., 4,059,633, Cl. 260-593.00H.
De Vault, Albert N.; and Holtz, Hans D., 4,059,535, Cl. 252-33.000.
Holtz, Hans D.; and Bonazza, Benedict R., 4,059,414, Cl. 44-58.000.
Kubicek, Donald H., 4,059,636, Cl. 260-609.00D.
Mathis, Ronald D.; and Dix, James S., 4,059,653, Cl. 260-857.0PG.
Philograph Publications Limited: *See*—
Tacey, Charles Arthur, 4,058,912, Cl. 35-34.000.
Phy, William S., to Fairchild Camera and Instrument Corporation. Device for forming reference axes on an image sensor array package. 4,058,899, Cl. 33-26.000.
Piaget, Robert E. Safety plug unit. 4,059,320, Cl. 339-19.000.
Pickett, James Henry, Jr. Trophy lamp. 4,059,752, Cl. 362-98.000.
Pierce, Perry H.; and Prendergast, Dan L., to Hewlett-Packard Company. Method for mounting printed circuit boards. 4,058,890, Cl. 29-625.000.
Pietzsch, Ludwig; and Overlach, Knud, to Dr. -Ing. Ludwig Pietzsch. Force sensing device. 4,059,012, Cl. 73-141.00A.
Pinamonti, Franco; and Maccone, Sergio, to Montecatini Edison S.p.A. Pesticidal compositions suitable for spreading from aircraft. 4,059,698, Cl. 424-211.000.
Pioneer Motor Bearing Co.: *See*—
Hollingsworth, Leon W., 4,059,318, Cl. 308-73.000.
Pira, Francois Jean: *See*—
De Roeck, Joseph Irma; and Pira, Francois Jean, 4,059,241, Cl. 242-75.500.
Pischke, LaMonte D.; and Shoaf, Myron D., to General Foods Corporation. Spray-dried L-aspartic acid derivatives. 4,059,706, Cl. 426-548.000.
Platt Saco Lowell Limited: *See*—
Shaw, Jack; and Ellingham, Bruce, 4,058,965, Cl. 57-58.910.
Plessey Incorporated: *See*—
Ledgerwood, Harry James, 4,059,212, Cl. 226-141.000.
Pletcher, Wayne A., to Minnesota Mining and Manufacturing Company. Adhesive composition and sheet-like product formed therewith. 4,059,715, Cl. 428-349.000.
Pluker, Hans: *See*—
Lardon, Marcel; and Pluker, Hans, 4,059,067, Cl. 118-7.000.
Plummer, Dexter Robert: *See*—
Gosling, Alexander Bennett; Plummer, Dexter Robert; and Stanwell-Smith, Colin Howard, 4,059,030, Cl. 74-798.000.
Pogozelski, Vincent F.: *See*—
Conger, Robert P.; and Pogozelski, Vincent F., 4,059,709, Cl. 427-264.000.
Poleri, Victor Joseph. Construction kit. 4,058,909, Cl. 35-16.000.
Polley, Richard D.; Nilson, Eric L.; Constantakis, Roberto; and Pruitt, Donovan E., to Iodinamics Corporation. Apparatus for purifying water. 4,059,522, Cl. 210-198.00R.
Polotsky, Vadim Evgenievich: *See*—
Vasiliev, Vladimir Sergeevich; Livshits, Abram Lazarevich; Polotsky, Vadim Evgenievich; and Zlatkin, Yakov Iosifovich, 4,059,788, Cl. 318-577.000.
Polva Nederland B. V.: *See*—
Acda, Petrus Marinus; and Guitoneau, Hans Edward, 4,059,291, Cl. 285-197.000.
Pommer, Lawrence: *See*—
Kahlert, George; Pommer, Lawrence; Davis, John; and Whebell, Bert, 4,059,061, Cl. 110-7.00A.
Poponiak, Michael Robert: *See*—
Gulitz, Louis; Kwap, Theodore William; Lisle, Walter Irving; O'Kane, Daniel Francis; and Poponiak, Michael Robert, 4,059,385, Cl. 431-12.000.
Portec, Inc.: *See*—
Ravani, Chandrakant D.; and Robertson, James C., 4,059,055, Cl. 105-368.00R.
Possum Controls Limited: *See*—
Jones, Michael Lloyd; and Jobson, Peter Meredith, 4,059,786, Cl. 318-17.000.
Post Office, The: *See*—
Kingswell, Leonard William; and Matthews, Oliver Charles, 4,059,727, Cl. 179-2.0AM.
Potomac Applied Mechanics, Inc.: *See*—
Stubbings, James H., 4,058,993, Cl. 70-58.000.
Potter, John Kenneth: *See*—
Green, Robin John; Johnson, Richard Shaw; and Potter, John Kenneth, 4,059,538, Cl. 252-95.000.
Potter, Ralph A.; and Scott, James L., to United States of America, Energy Research and Development Administration. (U,Zr)N alloy having enhanced thermal stability. 4,059,539, Cl. 252-301.10R.
PPG Industries, Inc.: *See*—
Crano, John C., 4,059,655, Cl. 260-983.000.
Rinehart, Jay Kent, 4,059,609, Cl. 260-455.00A.
Sare, Edward J.; and Lavanish, Jerome M., 4,059,677, Cl. 423-240.000.
Starr, Eugene W., 4,059,426, Cl. 65-25.00A.
Starr, Eugene W.; and Misson, George W., 4,059,427, Cl. 65-25.00A.
Prasad, Balram: *See*—
Leiby, Clare C., Jr.; and Prasad, Balram, 4,059,813, Cl. 331-94.000.
Prendergast, Dan L.: *See*—
Pierce, Perry H.; and Prendergast, Dan L., 4,058,890, Cl. 29-625.000.
Prescher, Gunter; Schreyer, Gerd; Weiberg, Otto; Wirthwein, Rolf; Waldmann, Helmut; Seifert, Hermann; Schwerdtel, Wulf; and Swodenk, Wolfgang, to Deutsche Gold-und Silber-Scheideanstalt Vormals Roessler; and Bayer Aktiengesellschaft. Process for the preparation of percarboxylic acid solutions. 4,059,619, Cl. 260-502.00R.
Preventative Systems, Inc.: *See*—
Harris, Nick S., 4,059,512, Cl. 210-24.000.
Prewitt, Richard H. Convertiblade. 4,059,247, Cl. 244-7.00R.
Price, William Lawrence. Board game. 4,059,275, Cl. 273-130.00D.
Prickett, Ervin. Boat bow dolly. 4,059,282, Cl. 280-47.13B.
Priede, Theodor: *See*—
Mansfield, Wilfred Percival; and Priede, Theodor, 4,059,085, Cl. 123-195.00R.
Primavesi, Alexander, deceased: *See*—
Primavesi, Otto Hubert Jan; and Primavesi, Alexander, deceased, 4,059,470, Cl. 156-238.000.
Primavesi, Dagmar Charlotte, legal representative: *See*—
Primavesi, Otto Hubert Jan; and Primavesi, Alexander, deceased, 4,059,470, Cl. 156-238.000.
Primavesi, Otto Hubert Jan; and Primavesi, Alexander, deceased (by Primavesi, Dagmar Charlotte, legal representative), to J. Bobst et Fils S.A. Apparatus and method for transferring a material from a carrier means to a sheet means. 4,059,470, Cl. 156-238.000.

Procter, Samuel Anderson, to Control Data Corporation. Synchronous pulse generator including flywheel tank circuit with phase locked loop. 4,059,812, Cl. 331-1.00A.
Produits Chimiques Ugine Kuhlmann: *See—*
Demarcq, Michel, 4,059,656, Cl. 260-990.000.
Foulletier, Louis; Pechmeze, Jacques Pierre Edmond; and Sureau, Robert Frederic Michel, 4,059,626, Cl. 260-578.000.
Foulletier, Louis; and Lalu, Jean-Pierre, 4,059,629, Cl. 260-583.0GG.
Prokai, Bela, to Union Carbide Corporation. Heterocyclic nitrogen containing siloxanes. 4,059,581, Cl. 544-69.000.
Prototech Company: *See—*
Petrow, Henry G.; and Allen, Robert J., 4,059,541, Cl. 252-313.00R.
Pruitt, Donovan E.: *See—*
Polley, Richard D.; Nilson, Eric L.; Constantakis, Roberto; and Pruitt, Donovan E., 4,059,522, Cl. 210-198.00R.
Puccio, Guy S., to Acme Highway Products Corporation. Uplift restraint for composite expansion joint assembly. 4,058,867, Cl. 14-16.500.
Pullman, Burke Cole. Games and educational devices. 4,059,272, Cl. 273-130.00E.
Pullman Incorporated: *See—*
Lopker, Edwin B., 4,059,674, Cl. 423-167.000.
Purdue Research Foundation: *See—*
Hem, Stanley L.; and White, Joe L., 4,059,681, Cl. 423-419.00P.
Purex Corporation: *See—*
Zieg, Steven A., 4,059,519, Cl. 210-169.000.
Purrer, Josef, to Maschinenfabrik Fahr Aktiengesellschaft Gottmadingen. Field chopper. 4,059,234, Cl. 241-222.000.
Quaney, Patrick E., to Associated Concrete Products, Inc. Utility box fastener. 4,059,199, Cl. 220-3.800.
Raasch, Hans, to W. Schlafhorst & Co. Device for protecting tangential drives of a textile machine. 4,058,966, Cl. 57-78.000.
Rabinowitz, Harold: *See—*
Geller, Thomas L.; and Rabinowitz, Harold, 4,059,464, Cl. 156-66.000.
Rader, Jean-Claude Joseph: *See—*
Chataigner, Jean; and Rader, Jean-Claude Joseph, 4,059,524, Cl. 210-220.000.
Ramiro de la Rosa, Raul. Steam injection apparatus. 4,059,078, Cl. 123-25.00K.
Ranger, Clifford A. Rock and root picker. 4,059,158, Cl. 171-63.000.
Rappen, Friedrich: *See—*
Kolling, Helmut; Rappen, Friedrich; and Geiser, Nikolaus, 4,059,720, Cl. 526-74.000.
Raskatov, Viktor Georgievich: *See—*
Barannik, Ivan Andreevich; Kondratenko, Anatoly Borisovich; Trukhin, Alexandr Fedorovich; Raskatov, Viktor Georgievich; Zharovsky, Ivan Vasilievich; Rudakov, Viktor Alexandrovich; Mordkovich, Andrei Efremovich; and Chalov, Alexandr Vasilievich, 4,059,372, Cl. 425-8.000.
Rasmussen, Harry R.; and Topel, Kenneth D., to Crest Industries, Inc. Pull-out receptacle for floor ducts. 4,059,321, Cl. 339-34.000.
Rauscher, Walter: *See—*
Winzer, Gerhard; and Rauscher, Walter, 4,059,337, Cl. 350-96.00C.
Ravani, Chandrakant D.; and Robertson, James C., to Portec, Inc. Railway car hinge-deck lock. 4,059,055, Cl. 105-368.00R.
Rax, Incorporated: *See—*
Berryman, Angus L.; Hooper, Gene R.; and Hague, Richard E., 4,059,056, Cl. 105-368.00R.
Ray, Ranjan; Tanner, Lee E.; and Cline, Carl F., to Allied Chemical Corporation. Metallic glasses with high crystallization temperatures and high hardness values. 4,059,441, Cl. 75-174.000.
Rayeski, Thomas J.: *See—*
Carmi, Arieh; Chang, Zung S.; and Rayeski, Thomas J., 4,059,429, Cl. 65-355.000.
Raymond Lee Organization, Inc., The: *See—*
Adamko, Edward W., 4,058,892, Cl. 30-178.000.
Chaisson, Maurice J., 4,059,191, Cl. 211-90.000.
Digman, Robert Howard, Sr., 4,058,928, Cl. 43-131.000.
Fischer, Edward T., 4,058,873, Cl. 24-73.0CH.
Hassan, Edward, 4,059,041, Cl. 85-3.00S.
Hershey, Virginia L.; and Hershey, George P., 4,058,927, Cl. 43-43.130.
Raynor, Warren S.: *See—*
Krivec, Bert; Brown, Elwood B.; and Raynor, Warren S., 4,059,180, Cl. 193-37.000.
RCA Corporation: *See—*
Ahmed, Adel Abdel Aziz, 4,059,793, Cl. 323-19.000.
Clark, Charles Albert, Jr., 4,059,785, Cl. 315-378.000.
DeStephanis, Ralph, 4,059,277, Cl. 274-23.00A.
Nubani, Jawdat Ibrahim; and Rysz, Walter Robert, 4,058,875, Cl. 29-25.150.
Rosenkranz, Thomas Francis; and Himics, Richard Joseph, 4,059,449, Cl. 96-91.00D.
Smith, Roland Wright; and Moore, Arnold Robert, 4,059,707, Cl. 427-35.000.
Reade, Richard F., to Corning Glass Works. Green colored glasses. 4,059,454, Cl. 106-39.700.
Reading, Hugh Thomas, to Readings of Lismore Pty. Limited. Magnetic separators. 4,059,510, Cl. 209-223.00A.
Readings of Lismore Pty. Limited: *See—*
Reading, Hugh Thomas, 4,059,510, Cl. 209-223.00A.
Redding, Robert Caldwell; and Vaughan, Joe Larry, to International Business Machines Corporation. Single print element selection apparatus with multiple selection inhibiting means. 4,059,184, Cl. 197-18.000.
Redington, Incorporated: *See—*
Vogel, Walter H., 4,059,264, Cl. 271-270.000.
Redlich, Rudolf: *See—*
Goossens, Walter; Hermann, Wolfgang; Keusch, Wilhelm; and Redlich, Rudolf, 4,059,412, Cl. 44-10.00H.
Reed Tool Company: *See—*
Alvarez, Joseph A.; and Mills, Robert J., 4,059,316, Cl. 308-8.200.
Reedy, James D.: *See—*
Lindberg, Robert C.; Reedy, James D.; and Yang, Kang, 4,059,683, Cl. 423-481.000.
Yang, Kang; Reedy, James D.; and Scamehorn, John F., 4,059,675, Cl. 423-240.000.
Yang, Kang; and Reedy, James D., 4,059,676, Cl. 423-240.000.
Reedy, James Dale; and Barker, Thomas Harold, to Union Carbide Corporation. Preparation of hydrocarbon chlorosilanes from polysilanes. 4,059,607, Cl. 260-448.20E.
Reffay, Louis: *See—*
Sedlacek, William S.; and Reffay, Louis, 4,059,331, Cl. 339-198.00R.
Reick, Franklin G., to Ebert, Michael, a part interest. Direct-acting low pressure sensor. 4,059,018, Cl. 73-418.000.
Reifers, Richard F.; Bixler, Kenneth D.; and Lord, Henry A., to Diamond International Corporation. Egg carton. 4,059,219, Cl. 229-2.5EC.
Reijonen, Yrjo: *See—*
Kankaanpaa, Matti; Nylund, Ragnar; and Reijonen, Yrjo, 4,059,482, Cl. 162-281.000.
Reinehr, Ulrich: *See—*
Neukam, Theo; Reinehr, Ulrich; Bentz, Francis; and Nischk, Gunther, 4,059,556, Cl. 260-30.200.
Reiss, Joseph M. Method and force determining apparatus for ice breaking vessels. 4,059,011, Cl. 73-133.00R.
Reiss, Siegfried: *See—*
Gross, Albert; Schaefer, Roland; and Reiss, Siegfried, 4,059,684, Cl. 424-4.000.
Reliable Electric Company: *See—*
Sedlacek, William S.; and Reffay, Louis, 4,059,331, Cl. 339-198.00R.
Remington Arms Company, Inc.: *See—*
Linde, John P.; and Bullis, Douglas E., 4,058,925, Cl. 42-79.000.
Remond, Georges: *See—*
Vincent, Michel; Remond, Georges; and Laubie, Michel, 4,059,621, Cl. 260-558.00R.
Republic Steel Corporation: *See—*
Limes, Robert W.; and Russell, Robert O., 4,059,455, Cl. 106-58.000.
Research Corporation: *See—*
Parker, Kathlyn A.; and Kosley, Raymond W., Jr., 4,059,575, Cl. 260-239.500.
Reuter Technologie GmbH: *See—*
Hilterhaus, Karl Heinz, 4,059,659, Cl. 264-45.300.
Revere Copper and Brass Incorporated: *See—*
Davis, Trevor Crombie Maitland; and Laurie, James Ernest, 4,059,672, Cl. 423-121.000.
Rexnord Inc.: *See—*
Krivec, Bert; Brown, Elwood B.; and Raynor, Warren S., 4,059,180, Cl. 193-37.000.
Rhee, Jhoon Goo. Protective helmet. 4,058,854, Cl. 2-412.000.
Rheinische Braunkohlenwerke Aktiengesellschaft: *See—*
Schulten, Rudolf; and Behr, Friedrich, 4,059,496, Cl. 204-104.000.
Rhodes, Melvin H., to Rockwell International Corporation. Second harmonic magnetic field detection circuit with means to rectify the sensed signal. 4,059,796, Cl. 324-253.000.
Rhone-Poulenc Industries: *See—*
Calas, Raymond; Dunogues, Jacques; Deleris, Gerard; Lefort, Marcel; and Simonnet, Christian, 4,059,608, Cl. 260-448.20E.
Rhone-Poulenc-Textile: *See—*
Guillermin, Rene; Joly, Jean; and Sangalli, Sylvio, 4,059,068, Cl. 118-420.000.
Rice, Seymour S., to Cities Service Company. Anode, anode basket and method of packaging anodes. 4,059,493, Cl. 204-3.000.
Richards, Shirley T., to Minnesota Mining and Manufacturing Company. Garment shield. 4,059,114, Cl. 128-287.000.
Richardson-Merrell Inc.: *See—*
Meyer, Donald R., 4,059,702, Cl. 424-248.550.
Richerot, Alain: *See—*
Boisde, Gilbert; and Richerot, Alain, 4,059,408, Cl. 23-267.00R.
Richmond, Martin. Therapeutic device for massaging gingival tissue. 4,059,101, Cl. 128-62.00A.
Richtzenhain, Hermann: *See—*
Blumenfeld, Georg; Richtzenhain, Hermann; Vogt, Wilhelm; and Volkommer, Norbert, 4,059,618, Cl. 560-221.000.
Ricoh Co., Ltd.: *See—*
Ariyama, Kenzo; Mano, Hiroshi; and Kamiyama, Shinichi, 4,059,394, Cl. 432-59.000.
Fujimoto, Sakae, 4,059,262, Cl. 271-35.000.
Kawamura, Atsushi; and Kawazu, Motoaki, 4,059,345, Cl. 350-252.000.
Riebel, Hans-Jochem: *See—*
Maurer, Fritz; Riebel, Hans-Jochem; Hammann, Ingeborg; Behrenz, Wolfgang; and Homeyer, Bernhard, 4,059,696, Cl. 424-200.000.

Rieger, Walter, to Bauhutte Leitl-Werke Rieger-Anlagentechnik GmbH. Building structure wall. 4,058,944, Cl. 52-235.000.

Ries, George W.: *See*—
Zbinden, James; and Ries, George W., 4,059,162, Cl. 173-37.000.

Rietema, Simon Petrus. Assembly and method for guiding a portable power saw. 4,059,038, Cl. 83-745.000.

Rieter Machine Works, Ltd.: *See*—
Spescha, Gelli; and Lattion, Andre, 4,058,962, Cl. 57-34.00R.
Stalder, Herbert, 4,058,964, Cl. 57-58.890.
Weber, Kurt, 4,059,185, Cl. 198-339.000.

Rigassi, Norbert: *See*—
Chodnekar, Madhukar Subraya; Pfiffner, Albert; Rigassi, Norbert; Schwieter, Ulrich; and Suchy, Milos, 4,059,600, Cl. 260-348.460.

Rigo, Larry E. Mountings for electrical fixtures in junction boxes. 4,059,328, Cl. 339-122.00R.

Rinehart, Jay Kent, to PPG Industries, Inc. S-naphthyl N-alkylthiolcarbamates. 4,059,609, Cl. 260-455.00A.

Rishel, John W., to Dover Corporation. Filter with axially shiftable rotating backwash selector. 4,059,518, Cl. 210-108.000.

Roark, Thomas A. Head gate. 4,059,073, Cl. 119-98.000.

Robert Bosch G.m.b.H.: *See*—
Eheim, Franz, 4,059,369, Cl. 417-494.000.
Jundt, Werner, 4,059,084, Cl. 123-148.00E.
Sohnle, Rudiger, 4,059,778, Cl. 310-68.00D.

Robertson, James C.: *See*—
Ravani, Chandrakant D.; and Robertson, James C., 4,059,055, Cl. 105-368.00R.

Robinson, Cecil H., to Johns Hopkins University, The. Anti-androgenic steroids. 4,059,630, Cl. 260-586.00E.

Robinson, Colin; and Walker, Derek, to Glaxo Laboratories Limited. Extraction of N-blocked amino acids from aqueous media. 4,059,573, Cl. 260-112.50R.

Rockwell International Corporation: *See*—
Espinosa, Gerald P., 4,059,537, Cl. 252-62.900.
Kennel, John M., 4,059,790, Cl. 318-689.000.
Kobayashi, Tsutomu; Archer, John L.; and Elliott, Michael T., 4,059,828, Cl. 365-32.000.
Rhodes, Melvin H., 4,059,796, Cl. 324-253.000.

Rode, France: *See*—
Dickinson, Peter D.; Osborne, Thomas E.; Rode, France; and Baum, Allen J., 4,059,750, Cl. 364-715.000.

Roderick, John James: *See*—
Allan, John Leslie Hugh; and Roderick, John James, 4,059,652, Cl. 260-848.000.

Rogers, Gerald D., to Texas Instruments Incorporated. Semiconductor memory array with field effect transistors programmable by alteration of threshold voltage. 4,059,826, Cl. 365-104.000.

Rohm GmbH: *See*—
Hitzler, Otto; Pennewiss, Horst; Froelich, August; Markert, Gerhard; and Wunderlich, Winfried, 4,059,574, Cl. 260-192.000.

Rohm and Haas Company: *See*—
Johnson, Wayne O., 4,059,435, Cl. 71-105.000.
Kelley, Louis E., 4,059,665, Cl. 264-128.000.
Lewis, Sheldon N.; and Haggard, Richard A., 4,059,616, Cl. 526-66.000.
Ollinger, Janet, 4,059,697, Cl. 424-211.000.

Rohr Industries, Incorporated: *See*—
Woodward, James R., 4,059,217, Cl. 228-181.000.

Rohringer, Peter: *See*—
Nachbur, Hermann; and Rohringer, Peter, 4,059,532, Cl. 252-8.100.

Roller, Thomas W., to Eastman Kodak Company. Apparatus for filtering and heating a liquid. 4,059,520, Cl. 210-184.000.

Romagnolo, Gerard, to Ugine Carbone. Cutting plates with rounded cutting edges and concave frustoconical cutting surfaces. 4,059,363, Cl. 407-114.000.

Rommen, Hans; and Stoy, Erich, to Schloemann- Siemag Aktiengesellschaft. Multi-roll rolling mill stand. 4,059,002, Cl. 72-238.000.

Roseberry, Ward A., to Outboard Marine Corporation. Deadman control and blade clutch for power rotary lawn mowers. 4,058,957, Cl. 56-11.300.

Rosen, Perry: *See*—
Holland, George William; Jernow, Jane Liu; and Rosen, Perry, 4,059,576, Cl. 542-426.000.
Kienzle, Frank; and Rosen, Perry, 4,059,577, Cl. 542-426.000.

Rosenberg, Ira E.; Ferguson, John A.; and Loveless, Norman P., to Clairol Incorporated. Hair fixing compositions containing fluoroterpolymers and method. 4,059,688, Cl. 424-71.000.

Rosenberg, Peretz. Fluid flow control device and fluid distribution system including a plurality of such devices. 4,059,230, Cl. 239-542.000.

Rosenblum, Frank: *See*—
Kitzinger, Frank; and Rosenblum, Frank, 4,059,016, Cl. 73-304.00R.

Rosenfeld, Pnina. Girdle accessory. 4,059,117, Cl. 128-531.000.

Rosenkranz, Hans Jurgen; and Rudolph, Hans, to Bayer Aktiengesellschaft. Stabilized acrylic acid esters of polyhydric alcohols and a process for their preparation. 4,059,721, Cl. 560-205.000.

Rosenkranz, Thomas Francis; and Himics, Richard Joseph, to RCA Corporation. Photoresist containing a thiodipropionate compound. 4,059,449, Cl. 96-91.00D.

Ross, Leon Irving. Vortex nucleation scrubbing method and apparatus. 4,059,419, Cl. 55-92.000.

Roth Freres, S.A.: *See*—
Roth, Jacques; Roth, Michel; Seiler, Paul; Lavenir, Roger; and Manigold, Alain, 4,059,660, Cl. 264-46.400.

Roth, Jacques; Roth, Michel; Seiler, Paul; Lavenir, Roger; and Manigold, Alain, to Roth Freres, S.A. Method of molding a light-weight panel. 4,059,660, Cl. 264-46.400.

Roth, Michel: *See*—
Roth, Jacques; Roth, Michel; Seiler, Paul; Lavenir, Roger; and Manigold, Alain, 4,059,660, Cl. 264-46.400.

Rothmans of Pall Mall Canada Limited: *See*—
Brackmann, Warren A.; and Di Ianni, Daniel, 4,059,121, Cl. 131-269.000.

Rottloff, Gunther: *See*—
Sundermann, Rudolf; Rottloff, Gunther; and Grigat, Ernst, 4,059,567, Cl. 260-47.00R.

Rougeot, Henri, to Thomson-CSF. Device for visualizing data presented in the form of radiant energy. 4,059,766, Cl. 250-370.000.

Rowsell, David G.: *See*—
Watson, Hugh R.; Rowsell, David G.; and Browning, John H. D., 4,059,118, Cl. 131-8.00R.

Ruble, Theodore A., to Sid Richardson Carbon & Gasoline Co. Method and apparatus for controlling surface temperature. 4,059,145, Cl. 165-1.000.

Rudakov, Viktor Alexandrovich: *See*—
Barannik, Ivan Andreevich; Kondratenko, Anatoly Borisovich; Trukhin, Alexandr Fedorovich; Raskatov, Viktor Georgievich; Zharovsky, Ivan Vasilievich; Rudakov, Viktor Alexandrovich; Mordkovich, Andrei Efremovich; and Chalov, Alexandr Vasilievich, 4,059,372, Cl. 425-8.000.

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Hori, Kikuo; Horiuchi, Takumi; Nishikawa, Mikio; Ryugo, Shiro; Ishizuka, Akira; and Takenaka, Yoshisuke, 4,059,239, Cl. 242-18.100.

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Jones, Vercoe C., 4,059,053, Cl. 104-35.000.

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Bartos, Joseph S.; and St. Onge, Robert J., 4,059,123, Cl. 134-102.000.

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Yamazaki, Tatsuo; Hayashida, Takemi; and Sakuma, Masatoshi, 4,059,046, Cl. 99-355.000.
Salco Products, Inc.: *See*—
Werner, David, 4,059,228, Cl. 239-106.000.
Samson, Ronald; and Botterill, Derrick. Board game including code defining playing pieces. 4,059,274, Cl. 273-130.00D.
Sanborn, Philip A., Jr.; Westbrook, Shelby F.; and Sullivan, Donald A., to W. R. Grace & Co.; and Hooper, Inc. Gas flushing or filling packaging machine. 4,058,953, Cl. 53-22.00A.
Sanda, Shougo: *See*—
Kasima, Osamu; and Sanda, Shougo, 4,059,079, Cl. 123-30.00D.
Sandoz Ltd.: *See*—
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Sangalli, Sylvio: *See*—
Guillermin, Rene; Joly, Jean; and Sangalli, Sylvio, 4,059,068, Cl. 118-420.000.
Sangesland, Odd E.: *See*—
Knowles, Gregory W.; Sangesland, Odd E.; Vroom, Henry J.; and Madey, Robert W., 4,059,093, Cl. 126-271.000.
Sankyo Company Limited: *See*—
Mishima, Hiroshi; Ogiso, Akira; and Kobayashi, Shinsaku, 4,059,641, Cl. 260-635.00R.
Sankyo Electric Company Limited: *See*—
Hatori, Kunitake, 4,059,319, Cl. 312-319.000.
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Nishino, Toyokazu; Hamagishi, Yasutaro; Oki, Toshikazu; and Murao, Sawao, 4,059,487, Cl. 195-28.00N.
Sare, Edward J.; and Lavanish, Jerome M., to PPG Industries, Inc. Catalytic oxidation of C_2-C_4 halogenated hydrocarbons. 4,059,677, Cl. 423-240.000.
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Satake, Kazuo: *See*—
Tomibe, Katsuhiko; Masuho, Yasuhiko; Matsuzawa, Kimihiko; Ishimoto, Sachio; Satake, Kazuo; and Watanabe, Tsuneo, 4,059,571, Cl. 260-112.00B.
Sato, Hideo: *See*—
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Sato, Masamichi, to Fuji Photo Film Co., Ltd. Noble metal image forming method. 4,059,445, Cl. 96-35.000.
Sato, Tomoari: *See*—
Yanagida, Kiyomi; Hirokane, Tadashi; Tsukiyasu, Tadashi; and Sato, Tomoari, 4,059,494, Cl. 204-28.000.
Sato, Yasushi: *See*—
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Satori, Toshio, to Fischer & Porter Co. Angle-to-current converter. 4,059,015, Cl. 73-209.000.
Sawa, Tomizo: *See*—
Musha, Morito; Sawa, Tomizo; and Kato, Osami, 4,059,511, Cl. 210-23.00R.
Sayers, Bernard. Method for custom fitting golf clubs. 4,059,270, Cl. 273-77.00R.
Saylor, Lee H.; and Overway, Roy E., to Sealed Power Corporation. Piston ring spacer-expander with overlap-preventing expander joint. 4,059,278, Cl. 277-139.000.
Scaggs, Anthony L.: *See*—
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Scamehorn, John F.: *See*—
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Schattner, Robert L.: *See*—
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Scherberich, Paul; and Pfeifer, Wolf-Dieter, to Deutsche Gold- und Silber-Schneideanstalt vormals Roessler. Process for formylation. 4,059,589, Cl. 260-306.70C.
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Brinkmann, Bernd; and Griebsch, Eugen, 4,059,549, Cl. 260-22.0TN.
Schild, Josef, to Vockenhuber, Karl; and Hauser, Raimund. Reflex system for cinematographic camera. 4,059,350, Cl. 352-141.000.
Schindler, Harvey D.: *See*—
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Schipper, John F.: *See*—
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Schliek, Gunter; and Tirp, Erwin, to Windmoller & Holscher. Apparatus for forming and taking away packets of bags. 4,059,044, Cl. 93-93.0HT.
Schloemann- Siemag Aktiengesellschaft: *See*—
Rommen, Hans; and Stoy, Erich, 4,059,002, Cl. 72-238.000.
Schlosberg, Richard H.; Gorbaty, Martin L.; and Lang, Robert J., to Exxon Research & Engineering Co. Method for the preparation of noncaking coals from caking coals by means of electrophilic aromatic substitution. 4,059,410, Cl. 44-1.00R.
Schmidt, Karl-Heinz: *See*—
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Schmidt, Martin: *See*—
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Schmieder, Helmut; and Stieglitz, Ludwig, to Gesellschaft fur Kernforschung m.b.H. Method for increasing the lifetime of an extraction medium used for reprocessing spent nuclear fuel and/or breeder materials. 4,059,671, Cl. 423-10.000.
Schnee, Wilhelm: *See*—
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Scholl, Charles H.; Janner, John R., Jr.; Stumphauzer, William C.; and Shuster, Duane O., to Nordson Corporation. Hot melt thermoplastic adhesive foam system. 4,059,466, Cl. 156-78.000.
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Scholle, Jean-Claude: *See*—
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Schollmeier, Charles E.; and Leiser, Roger S., to A. E. Staley Manufacturing Company. Solid anhydrous dextrose. 4,059,460, Cl. 127-29.000.
Schott, Charles M., Jr., to Gloucester Engineering Co., Inc. Toggle press. 4,059,381, Cl. 425-406.000.
Schranz, Karl-Wilhelm: *See*—
Meier, Ernst; Credner, Hans Heinrich; Lassig, Wolfgang; Kuffner, Karl; and Schranz, Karl-Wilhelm, 4,059,447, Cl. 96-56.400.
Schreiber, Robert E.; and Zelt, Edward J., to Stackpole Carbon Company. Electric motor brush mounting. 4,059,776, Cl. 310-242.000.
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Schulten, Rudolf; and Behr, Friedrich, to Rheinische Braunkohlenwerke Aktiengesellschaft. Process for the preparation of sulfuric acid from sulphur dioxide. 4,059,496, Cl. 204-104.000.
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Schulz, Horst; Flosser, Josef; Kessler, Reinhard; Schmidt, Karl-Heinz; Eisend, Ewald; Hild, Erich; Loffler, Karl-Heinz; and Steuer, Werner, to Fichtel & Sachs AG. Multiple speed hub with coaster brake. 4,059,028, Cl. 74-781.00B.
Schurger, Rainer: *See*—
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Schuster, Wilhelm; and Schuluter, Gert, to Battelle-Institute e.V. Swab and method of taking cell smears for diagnostic examination. 4,059,404, Cl. 23-230.00B.
Schwander, Dieter: *See*—
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Schwarz, Gunter. Ski brake mechanism. 4,059,284, Cl. 280-605.000.
Schwerdtel, Wulf: *See*—
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Schwieter, Ulrich: *See*—
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Sea Tank Co. S.A.: *See*—
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Sealed Power Corporation: *See*—
Saylor, Lee H.; and Overway, Roy E., 4,059,278, Cl. 277-139.000.
Sedgwick, Jarvis D., to Sumrall, James. Tire changing machine. 4,059,140, Cl. 157-1.170.
Sedlacek, William S.; and Reffay, Louis, to Reliable Electric Company. Terminal block. 4,059,331, Cl. 339-198.00R.
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Sensor Corporation: *See*—
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Serizawa, Masabumi; and Takezaki, Tsuneo, to Matsushita Electric Industrial Co., Ltd. Voltage supply circuit for voltage-dependent capacitor diode tuning. 4,059,791, Cl. 363-37.000.
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Settlemyer, Bernard W.; Knappenberger, Clifford W.; and Bader, Alfred, to General Cable Corporation. Detecting apparatus with excess pressure protectors. 4,059,017, Cl. 73-395.000.
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Paletto, Raimondo, 4,059,810, Cl. 330-65.000.
Shaffer, John W., to GTE Sylvania Incorporated. Photoflash lamp. 4,059,388, Cl. 431-95.00R.
Shaffer, Louis W. W., to Xerox Corporation. Photoreceptor belt system. 4,059,353, Cl. 355-16.000.
Shannon, Richard D. Ear rack for veterinary purposes. 4,059,106, Cl. 128-133.000.
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Hartelius, Clifford C., Jr., 4,059,338, Cl. 350-96.00C.
Shaw, David N., to Dunham-Bush, Inc. Heat pump system with high efficiency reversible helical screw rotary compressor. 4,058,988, Cl. 62-160.000.
Shaw, Jack; and Ellingham, Bruce, to Platt Saco Lowell Limited. Open-end spinning machines. 4,058,965, Cl. 57-58.910.
Shaw, Michael Francis: *See*—
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Shaw, William Stuart, to Humboldt Holdings, Inc. Fireplace heating unit. 4,059,090, Cl. 126-121.000.
Sheldon, John D., to Outboard Marine Corporation. Rotary engine stationary gear locating and timing device. 4,059,371, Cl. 418-61.00A.
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Cannell, Lawrence G., 4,059,644, Cl. 260-666.0PY.
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Wald, Milton M.; and Kim, Leo, 4,059,646, Cl. 260-676.00R.
Wald, Milton M.; and Kim, Leo, 4,059,647, Cl. 260-676.00R.
Shelton, Peter Alfred, to Fiat Trattori S.p.A. Three-point tractor linkage. 4,059,283, Cl. 280-461.00A.
Shen, Chung Y.: *See*—
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Shibata, Shoji: *See*—
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Shimizu, Takeshi. Hinge assembly for knock down furniture. 4,058,871, Cl. 16-172.000.
Shimomoto, Mithuo: *See*—
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Shimp, David Alan, to Celanese Polymer Specialties Company. Aqueous dispersions of polyhydroxy polyether resins and aminoplast resins. 4,059,550, Cl. 260-29.40R.
Shin-Etsu Chemical Company Limited: *See*—
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Shirey, James W., to Schroder, John, a part interest. Solderless prong connector for coaxial cable. 4,059,330, Cl. 339-177.00R.
Shoaf, Myron D.: *See*—
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Shono, Tatsuya; and Matsumura, Yoshihiro, to Otsuka Kagaku Yakuhin Kabushiki Kaishi. Process for preparing 3-oxy-4H-pyran-4-one derivatives. 4,059,595, Cl. 260-345.90R.
Shoup, Robert D.; and Wein, William J., to Corning Glass Works. Low temperature production of high purity fused silica. 4,059,658, Cl. 264-43.000.
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Sichart, Frithjof V., to Siemens Aktiengesellschaft. Differential amplifier. 4,059,809, Cl. 330-253.000.
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Siddall, Don F.; and Hoffman, Vincent L., to Hi-Life Rubber Co., Inc. Milking inflations. 4,059,070, Cl. 119-14.470.
Sieben, Joannes Henricus Franciscus: *See*—
Witterick, Petrus Johannes Julius; and Sieben, Joannes Henricus Franciscus, 4,059,387, Cl. 431-93.000.
Siegwart, Emil. Apparatus for manufacturing tubes. 4,058,997, Cl. 72-50.000.
Siemens Aktiengesellschaft: *See*—
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Sichart, Frithjof V., 4,059,809, Cl. 330-253.000.
Strunz, Dieter O.; and Kern, Wolfgang, 4,059,395, Cl. 432-72.000.
Vanderbusse, Robert, 4,059,734, Cl. 179-18.0BD.
Winzer, Gerhard; and Rauscher, Walter, 4,059,337, Cl. 350-96.00C.
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Sigmatex, A.G.: *See*—
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Simon, Hans. Electric connector. 4,059,335, Cl. 339-272.0UC.
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Armstrong, Donald E.; Sindlinger, Ronald E.; Cohen, Bernard; Tozier, John E.; and Audesse, Emery G., 4,059,389, Cl. 431-95.00R.
Singer Company, The: *See*—
Vagt, Henry Tyrrell, Jr., 4,059,806, Cl. 329-107.000.
Singer, Gunter: *See*—
Mack, Heinz; and Singer, Gunter, 4,058,895, Cl. 32-32.000.
Singerman, Gary M., to Gulf Oil Corporation. O,O-diethyl-O-carboxamidophosphate esters and use to combat insects and mites. 4,059,699, Cl. 424-211.000.
Sipler, Clarence L. Connector. 4,059,293, Cl. 285-236.000.
Skates, Raymond E. Expansible coupling. 4,059,292, Cl. 285-229.000.
SKF Industrial Trading and Development Company B.V.: *See*—
Ernst, Horst Manfred; Olschewski, Armin; Schurger, Rainer; Walter, Lothar; Brandenstein, Manfred; and Burkl, Erich, 4,059,179, Cl. 192-98.000.
Skochdopole, Richard E.: *See*—
Corbett, John M.; Skochdopole, Richard E.; and Scaggs, Anthony L., 4,059,545, Cl. 260-2.5FP.
Skoniecczny, Wayne J. Vegetation clipping catcher. 4,058,956, Cl. 56-1.000.
Slama, Francis J.; and Fielding, Ivor R., to Standard Oil Company (Indiana). Anti-drip additive system for fire retardant polypropylene. 4,059,650, Cl. 260-837.00R.
Smilg, Benjamin; and Isaacson, Milton S., to Vibrodyne, Inc. Vibratory

apparatus with electromagnet control system. 4,058,935, Cl. 51-163.100.

Smith, Donovan Norman, Jr., to Mobay Chemical Corporation. Production of pinacolone. 4,059,634, Cl. 260-593.00R.

Smith, Edward M.; Casada, James H.; and Taylor, Timothy H., to Deere & Company. Tillage apparatus and improved blade therefor. 4,059,161, Cl. 172-60.000.

Smith, Forrest D. Shotgun safety device. 4,058,923, Cl. 42-17.000.

Smith, Fritz A.: *See*—
Derr, Walter R.; McClernon, Joseph R.; McGovern, Stephen J.; and Smith, Fritz A., 4,059,648, Cl. 260-676.00R.

Smith, Harry: *See*—
Buckle, Derek Richard; Cantello, Barrie Christian Charles; and Smith, Harry, 4,059,704, Cl. 424-269.000.

Smith, John E.: *See*—
Bonecutter, Thayer A.; Lewis, Charles E.; and Smith, John E., 4,059,816, Cl. 337-278.000.

Smith Kline & French (Proprietary) Limited: *See*—
Erasmus, Frans P. G., 4,059,111, Cl. 128-223.000.

Smith, Marvin M. Method for extending the lower lean limit of running of internal combustion engines and improving the combustion of fluid fuels. 4,059,411, Cl. 44-51.000.

Smith, Richard E.: *See*—
Stange, Klaus K.; Smith, Richard E.; Hamlin, Thomas J.; and Cassano, James R., 4,059,260, Cl. 271-3.000.

Smith, Robert L.; Lee, Ta-Jyh; and Cragoe, Edward J., Jr., to Merck & Co., Inc. Certain thiazolidine compounds. 4,059,587, Cl. 260-301.000.

Smith, Rodney I. Concrete highway traffic barricade having integrally formed coupling. 4,059,362, Cl. 404-6.000.

Smith, Roland Wright; and Moore, Arnold Robert, to RCA Corporation. Method of filling apertures with crystalline material. 4,059,707, Cl. 427-35.000.

Smith, William S., Jr., to Exxon Research & Engineering Co. Curable blends of EPDM and polypropylene. 4,059,651, Cl. 260-848.000.

SmithKline Corporation: *See*—
Berges, David A., 4,059,591, Cl. 260-308.00D.
DeMarinis, Robert M.; and Weisbach, Jerry A., 4,059,578, Cl. 544-21.000.

Snider, George William: *See*—
Earle, Paul Lewis; and Snider, George William, 4,058,947, Cl. 52-396.000.

Snowdon, Brian: *See*—
MacDonald, Eric John Christopher; and Snowdon, Brian, 4,059,195, Cl. 214-44.00R.

Snyder, Gene L.; and Hennessey, Walter F., Jr., to Bendix Corporation, The. Electrical connector. 4,059,324, Cl. 339-89.00M.

Societe a Responsabilite Limitee dite: TECCA: *See*—
Corbic, Yves Jean, 4,059,377, Cl. 425-305.100.

Societe Anonyme D.B.A.: *See*—
Carre, Jean-Jacques, 4,059,174, Cl. 188-195.000.

Societe Degremont: *See*—
Tardivel, Jacques, 4,059,531, Cl. 210-522.000.

Soden, George B.: *See*—
Madsen, Elmer W.; and Soden, George B., 4,059,024, Cl. 74-421.00R.

Sodickson, Lester A.; and Lim, Franklin, to Damon Corporation. Method and apparatus for analysis of constituent carried in fibrous medium. 4,059,405, Cl. 23-230.00R.

Sofer, George A.: *See*—
Bupp, Lamar P.; and Sofer, George A., 4,059,484, Cl. 176-78.000.

Sohnle, Rudiger, to Robert Bosch G.m.b.H. Rectifier assembly structure, particularly for automotive-type alternator-rectifier combination. 4,059,778, Cl. 310-68.00D.

Sollich AG: *See*—
Sollich, Helmut, 4,059,378, Cl. 425-362.000.

Sollich, Helmut, to Sollich KG. Conditioning machine for chocolate masses. 4,059,047, Cl. 99-455.000.

Sollich, Helmut, to Sollich AG. Method and a machine for removing from their molds moldings of confectionery masses which have been formed into chocolate centers, bars or other single or continuous moldings. 4,059,378, Cl. 425-362.000.

Sollich KG: *See*—
Sollich, Helmut, 4,059,047, Cl. 99-455.000.

Solomons, William Ebenezer: *See*—
Mathison, Ian William; Solomons, William Ebenezer; and Jones, Raymond Henry, 4,059,586, Cl. 260-287.00D.

Sony Corporation: *See*—
Hamada, Osamu, 4,059,807, Cl. 330-10.000.
Ohsawa, Mitsuo; Yamatani, Wataru; and Onoe, Yukio, 4,059,802, Cl. 325-398.000.
Yamanaka, Seisuke; and Nagumo, Fumio, 4,059,839, Cl. 358-44.000.

Soos, Nicholas Alec: *See*—
Mancke, Ralph Gustavus; and Soos, Nicholas Alec, 4,059,467, Cl. 156-80.000.

Sopecom S.A. Fribourg: *See*—
Koch, Friedrich; and Fink, Lothar, 4,059,375, Cl. 425-589.000.

Southern Railway Company: *See*—
Larsen, Glen D., 4,059,192, Cl. 213-61.000.

Sovitec S.A.: *See*—
De Vos, Daniel; Michel, Paul-Marie; and Berger, Alfred, 4,059,423, Cl. 65-21.000.

Spanel, Abram N. Hair cutters. 4,058,891, Cl. 30-30.000.

Spanel, Abram N.; Eiland, P. Frank; and Jacobs, David R., to Spanel, Abram N. Apparatus for converting oscillatory motion to reciprocating motion. 4,059,021, Cl. 74-89.200.

Speakman, Derek Norman Alfred, to Imperial Chemical Industries Limited. Paint manufacture. 4,059,547, Cl. 260-17.00R.

Specht, Thomas F.; Trodler, Juergen W.; and Vanecek, Pavel, to Union Special Corporation. Automatic brake mechanism for milling machines. 4,059,173, Cl. 188-110.000.

Sperry Rand Corporation: *See*—
Sadler, Loren G.; and Mast, Aquila D., 4,058,958, Cl. 56-228.000.

Spescha, Gelli; and Lattion, Andre, to Rieter Machine Works, Ltd. Method and apparatus for detecting periodic yarn irregularities in a yarn between a yarn forming stage and a yarn winding stage. 4,058,962, Cl. 57-34.00R.

Spickler, John Martin: *See*—
Gavin, John Henry; and Spickler, John Martin, 4,058,881, Cl. 29-715.000.

Spiral Tubing Corporation: *See*—
Perkins, Robert W., 4,059,004, Cl. 72-299.000.

Spitzer, Artur; Biedert, Hartmut; and Gramlich, Fritz, deceased (by Gramlich, Ute, legal representative), to Spitzer Silo-Fahrzeugwerk KG. Process for discharging bulk material from a silo. 4,059,311, Cl. 302-53.000.

Spitzer Silo-Fahrzeugwerk KG: *See*—
Spitzer, Artur; Biedert, Hartmut; and Gramlich, Fritz, deceased, 4,059,311, Cl. 302-53.000.

Sprague Electric Company: *See*—
Bernard, Walter J., 4,059,442, Cl. 75-208.00R.

Sproul, Nolte V., to Aspro, Inc. One-piece sintered pulley hub construction. 4,059,023, Cl. 74-230.300.

Squire, Christopher John: *See*—
Le Count, David James; and Squire, Christopher John, 4,059,622, Cl. 260-559.00A.

Stinegurski, Eugen; and Wilkinson, Donald, to Combustion Engineering, Inc. Buckstay arrangement. 4,059,075, Cl. 122-6.00A.

Stackpole Carbon Company: *See*—
Schreiber, Robert E.; and Zelt, Edward J., 4,059,776, Cl. 310-242.000.

Stahlecker, Fritz, to Stahlecker, Fritz; and Stahlecker, Hans. Open-end spinning machine with a plurality of spinning units and with at least one servicing device. 4,058,963, Cl. 57-56.000.

Stahlecker, Hans: *See*—
Stahlecker, Fritz, 4,058,963, Cl. 57-56.000.

Stal-Laval Turbin AB: *See*—
Ferm, Stig; and Torstenfelt, Ragnar, 4,058,973, Cl. 60-39.09R.

Stalder, Herbert, to Rieter Machine Works, Ltd. Open-end rotor for a spinning machine. 4,058,964, Cl. 57-58.890.

Standard Oil Company, The: *See*—
Judzis, Arnis; and Bond, Thomas J., 4,059,380, Cl. 425-298.000.

Standard Oil Company (Indiana): *See*—
Blaha, Eli W.; Koster, Sandra K.; and Wang, Chen-Shen, 4,059,719, Cl. 526-52.000.
Slama, Francis J.; and Fielding, Ivor R., 4,059,650, Cl. 260-837.00R.

Stanford Research Institute: *See*—
Murdock, David M., 4,059,098, Cl. 128-2.00V.

Stange, Klaus K.; Smith, Richard E.; Hamlin, Thomas J.; and Cassano, James R., to Xerox Corporation. Document handling apparatus. 4,059,260, Cl. 271-3.000.

Stanwell-Smith, Colin Howard: *See*—
Gosling, Alexander Bennett; Plummer, Dexter Robert; and Stanwell-Smith, Colin Howard, 4,059,030, Cl. 74-798.000.

Star Dental Manufacturing Co., Inc.: *See*—
Nash, John E., 4,058,898, Cl. 32-59.000.

Starr, Eugene W., to PPG Industries, Inc. Method and apparatus for heating glass sheets with recirculated gas. 4,059,426, Cl. 65-25.00A.

Starr, Eugene W.; and Misson, George W., to PPG Industries, Inc. Electric glass sheet heating furnace and method of using. 4,059,427, Cl. 65-25.00A.

Stauffer Chemical Company: *See*—
Baker, Don R.; and Gutman, Arnold D., 4,059,625, Cl. 260-566.0AE.

Stawinski, Jacek: *See*—
Narang, Saran A.; and Stawinski, Jacek, 4,059,592, Cl. 260-308.00D.

Stedman, Robert N., to Caterpillar Tractor Co. Mine drilling apparatus and method. 4,059,163, Cl. 175-73.000.

Stedman, Robert N., to Caterpillar Tractor Co. Lift truck mast positioning mechanism. 4,059,172, Cl. 187-9.00E.

Steiger, Anton, to Sulzer Brothers Limited. Reciprocating internal combustion engine for operation with fuel in powder form. 4,059,077, Cl. 123-23.000.

Steiner American Corporation: *See*—
Steiner, Robert L., 4,059,422, Cl. 55-418.000.

Steiner, Robert L., to Steiner American Corporation. Dispenser for odor control agent. 4,059,422, Cl. 55-418.000.

Stelly, Charles Warren: *See*—
Weidler, Jay B., Jr.; and Stelly, Charles Warren, 4,058,984, Cl. 61-48.000.

Stephenson, Roger: *See*—
Phillips, John J.; and Stephenson, Roger, 4,059,332, Cl. 339-113.00R.

Sterling Drug Inc.: *See*—
Eggensperger, Heinz; Beilfuss, Wolfgang; and Ehlers, Helmut Hermann, 4,059,596, Cl. 260-347.800.

Stetson, Ralph B.: *See*—
Ouelette, Ronald J.; Canney, Robert S.; and Stetson, Ralph B., 4,059,326, Cl. 339-113.00R.

Steuer, Werner: *See*—
Schulz, Horst; Flosser, Josef; Kessler, Reinhard; Schmidt, Karl-Heinz; Eisend, Ewald; Hild, Erich; Loffler, Karl-Heinz; and Steuer, Werner, 4,059,028, Cl. 74-781.00B.

Stevens, Daryl A.; and Wicktor, Russell D. Water safety device. 4,058,862, Cl. 9-14.000.

Stewart, John M., to University Patents, Inc. Analgesic action of substance P. 4,059,693, Cl. 424-177.000.

Stewart, John W., to NCR Corporation. Solenoid driver circuit. 4,059,844, Cl. 361-152.000.

Steyr-Daimler-Puch Aktiengesellschaft: *See*—
Mullner, Franz, 4,058,924, Cl. 42-69.00R.

Stieglitz, Ludwig: *See*—
Schmieder, Helmut; and Stieglitz, Ludwig, 4,059,671, Cl. 423-10.000.

Story, Anne W., to United States of America, Transportation. Roadrunner alcohol safety interlock system. 4,058,911, Cl. 35-22.00R.

Stoy, Erich: *See*—
Rommen, Hans; and Stoy, Erich, 4,059,002, Cl. 72-238.000.

Strahorn, David F.; and Goldstein, Roger F., to Chevron Research Company. Liquid separation apparatus and method. 4,059,517, Cl. 210-73.00R.

Strathearn Audio Limited: *See*—
Gosling, Alexander Bennett; Plummer, Dexter Robert; and Stanwell-Smith, Colin Howard, 4,059,030, Cl. 74-798.000.

Strickler, Allen, to Beckman Instruments, Inc. Automated electrophoresis unit. 4,059,501, Cl. 204-299.00R.

Strike, Donald Peter, to American Home Products Corporation. 15-Substituted prostanoic acids for treating bronchial spasm. 4,059,701, Cl. 424-250.000.

Stritzel, Gene A., to Gleason Works, The. Two stage limited slip differential. 4,059,026, Cl. 74-711.000.

Stromberg-Carlson Corporation: *See*—
Altenburger, Otto, 4,059,733, Cl. 179-18.0ET.

Struble, Dean L.; and Lilly, Charles E., to Canadian Patents and Development Limited. Attractant for beet webworm moths. 4,059,689, Cl. 424-84.000.

Strunz, Dieter O.; and Kern, Wolfgang, to Siemens Aktiengesellschaft. Device for removing carbonizable residues. 4,059,395, Cl. 432-72.000.

Stuart, Ronald Sangster: *See*—
Walsingham, Richard Warren; and Stuart, Ronald Sangster, 4,059,606, Cl. 260-448.20B.

Stubbings, James H., to Potomac Applied Mechanics, Inc. Lock box. 4,058,993, Cl. 70-58.000.

Stumphauzer, William C.: *See*—
Scholl, Charles H.; Janner, John R., Jr.; Stumphauzer, William C.; and Shuster, Duane O., 4,059,466, Cl. 156-78.000.
Scholl, Charles H.; Janner, John R., Jr.; and Stumphauzer, William C., 4,059,714, Cl. 428-310.000.

Sturgill, Lawrence W. Glass block panel. 4,058,943, Cl. 52-227.000.

Suchy, Milos: *See*—
Chodnekar, Madhukar Subraya; Pfiffner, Albert; Rigassi, Norbert; Schwieter, Ulrich; and Suchy, Milos, 4,059,600, Cl. 260-348.460.

Sugimura, Kazuo: *See*—
Sugimura, Nobuyuki; and Sugimura, Kazuo, 4,059,125, Cl. 137-73.000.

Sugimura, Nobuyuki; and Sugimura, Kazuo. Pressure container with an injection valve provided with a fusible valve member. 4,059,125, Cl. 137-73.000.

Sugiyama, Hironari; Chiyomaru, Isao; Okuda, Itsuki; Yamamoto, Hisaaki; and Ito, Hideo. Substituted derivatives of 1,1-dichloroalkene-1 and their preparation and uses. 4,059,635, Cl. 260-609.00E.

Sugiyama, Masatoshi; Kato, Eiichi; and Nakamura, Yasuharu, to Fuji Photo Film Co., Ltd. Dye containing photographic sensitive elements. 4,059,448, Cl. 96-84.00A.

Sullivan, Donald A.: *See*—
Sanborn, Philip A., Jr.; Westbrook, Shelby F.; and Sullivan, Donald A., 4,058,953, Cl. 53-22.00A.

Sulzer Brothers Limited: *See*—
Bucher, Robert R., 4,059,131, Cl. 139-59.000.
Doerre, Erhard; Semlitsch, Manfred; and Frey, Otto, 4,058,856, Cl. 3-1.910.
Steiger, Anton, 4,059,077, Cl. 123-23.000.

Sumita, Tadayuki: *See*—
Ito, Yasuro; Kaga, Hideharu; Yamamoto, Yasuhiro; and Sumita, Tadayuki, 4,059,376, Cl. 425-546.000.

Sumitomo Aluminum Smelting Co., Ltd.: *See*—
Yanagida, Kiyomi; Hirokane, Tadashi; Tsukiyasu, Tadashi; and Sato, Tomoari, 4,059,494, Cl. 204-28.000.

Sumitomo Chemical Company, Limited: *See*—
Hosaka, Hirokazu; Tanimoto, Kenji; Okabe, Hiromichi; Tanaka, Kunthiko; Ueda, Yuji; and Dohgane, Iwao, 4,059,637, Cl. 260-610.00A.
Yamazaki, Noboru; and Higashi, Fukuji, 4,059,603, Cl. 260-408.000.

Summa Corporation: *See*—
Johnson, Lavell R., 4,059,685, Cl. 424-12.000.

Sumrall, James: *See*—
Sedgwick, Jarvis D., 4,059,140, Cl. 157-1.170.

Sundermann, Rudolf; Rottloff, Gunther; and Grigat, Ernst, to Bayer Aktiengesellschaft. High molecular weight polytriazines of soluble polymeric N-cyano-isourea ethers. 4,059,567, Cl. 260-47.00R.

Suntech, Inc.: *See*—
Hansel, William B., 4,059,135, Cl. 141-207.000.

Superior Oil Company, The: *See*—
Knight, John H., 4,058,905, Cl. 34-15.000.

Sureau, Robert Frederic Michel: *See*—
Foulletier, Louis; Pechmeze, Jacques Pierre Edmond; and Sureau, Robert Frederic Michel, 4,059,626, Cl. 260-578.000.

Suys, Andre Roger: *See*—
Van Landeghem, Willy Karel; and Suys, Andre Roger, 4,059,768, Cl. 250-483.000.

Suzuki, Kensuke; Sasaki, Takeshi; and Matsuzaki, Mitsuyuki, to Hitachi, Ltd. Glass-moulded type semiconductor device. 4,059,837, Cl. 357-73.000.

Suzuki, Shuzo: *See*—
Hachikubo, Kazumasa; and Suzuki, Shuzo, 4,059,488, Cl. 195-28.00R.

Suzuki, Takeshi: *See*—
Tohyama, Masao; Ichigo, Minoru; Suzuki, Takeshi; Nakasu, Makoto; Ando, Akinobu; Yoshida, Akitoshi; Kosaka, Masaharu; Hayasi, Norihisa; and Inoue, Shigeki, 4,059,553, Cl. 260-29.60S.

Swodenk, Wolfgang: *See*—
Prescher, Gunter; Schreyer, Gerd; Weiberg, Otto; Wirthwein, Rolf; Waldmann, Helmut; Seifert, Hermann; Schwerdtel, Wulf; and Swodenk, Wolfgang, 4,059,619, Cl. 260-502.00R.

Sybron Corporation: *See*—
McGivern, Robert F., 4,059,529, Cl. 210-519.000.

Syntex (U.S.A.) Inc.: *See*—
Nelson, Peter H.; and Untch, Karl G., 4,059,611, Cl. 260-456.00P.
Walker, Keith A. M., 4,059,705, Cl. 424-273.00R.

Syracuse Plastics, Inc.: *See*—
Falcone, Joseph R., 4,059,294, Cl. 285-238.000.

Szabo, Emery: *See*—
Hoch, Samuel; Ceprini, Mario Q.; and Szabo, Emery, 4,059,562, Cl. 260-45.75S.

Sze, Morgan C.; Schindler, Harvey D.; and Fanelli, Anthony, to Lummus Company, The. Stripping ammonia from liquid effluent of a hydrodenitrification process. 4,059,503, Cl. 208-254.00H.

T.I. (Group Services) Limited: *See*—
Hartley, John Edward, 4,059,036, Cl. 83-188.000.

Tacey, Charles Arthur, to Philograph Publications Limited. Didactic apparatus. 4,058,912, Cl. 35-34.000.

Tajsei Corporation: *See*—
Ito, Yasuro; Kaga, Hideharu; Yamamoto, Yasuhiro; and Sumita, Tadayuki, 4,059,376, Cl. 425-546.000.

Takada, Masamichi: *See*—
Uchino, Hisanori; Takada, Masamichi; Shimizu, Takahiro; Shibayama, Masamitsu; and Furuno, Fumiya, 4,059,196, Cl. 214-138.00R.

Takahashi, Masazumi: *See*—
Takida, Hiroshi; Kido, Akio; and Takahashi, Masazumi, 4,058,904, Cl. 34-12.000.

Takahashi, Yoshinao; and Takeuchi, Kazuo, to Takeda Chemical Industries, Ltd. Treating impaired consciousness with glutamyl-L-histidyl-L-prolinamide. 4,059,692, Cl. 424-177.000.

Takahashi, Yutaka; and Kobayashi, Toshiji, to Kawasaki Yukogyo Kabushiki Kaisha. Apparatus for cooling steel blooms, slabs, and the like. 4,059,253, Cl. 266-259.000.

Takanihashi, Hiromitsu: *See*—
Yoshizaki, Hiroyuki; Takanihashi, Hiromitsu; and Masuda, Yoshitaka, 4,059,565, Cl. 260-47.0XA.

Takeda Chemical Industries, Ltd.: *See*—
Iwasa, Susumu; and Yoshida, Isamu, 4,059,491, Cl. 195-103.50A.
Takahashi, Yoshinao; and Takeuchi, Kazuo, 4,059,692, Cl. 424-177.000.

Takeda, Makoto: *See*—
Takematsu, Tetsuo; Konnai, Makoto; Takeda, Makoto; Fuga, Nobuhiko; Ikeda, Kaoru; and Shugaya, Kiyoshi, 4,059,431, Cl. 71-87.000.
Takematsu, Tetsuo; Konnai, Makoto; Takeda, Makoto; Fuga, Nobuhiko; Ikeda, Kaoru; and Shugaya, Kiyoshi, 4,059,432, Cl. 71-87.000.

Takematsu, Tetsuo; Konnai, Makoto; Takeda, Makoto; Fuga, Nobuhiko; Ikeda, Kaoru; and Shugaya, Kiyoshi, to Mitsubishi Petrochemical Co., Ltd. Plant growth regulator. 4,059,431, Cl. 71-87.000.

Takematsu, Tetsuo; Konnai, Makoto; Takeda, Makoto; Fuga, Nobuhiko; Ikeda, Kaoru; and Shugaya, Kiyoshi, to Mitsubishi Petrochemical Co., Ltd. Plant growth regulator. 4,059,432, Cl. 71-87.000.

Takemura, Susumu; Onoyama, Masao; and Tsuji, Masanobu, to Nippon Steel Corporation. Highly corrosion resistant ferritic stainless steel. 4,059,440, Cl. 75-126.00C.

Takenaka, Yoshisuke: *See*—
Hori, Kikuo; Horiuchi, Takumi; Nishikawa, Mikio; Ryugo, Shiro; Ishizuka, Akira; and Takenaka, Yoshisuke, 4,059,239, Cl. 242-18.100.

Takeuchi, Kazuo: *See*—
Takahashi, Yoshinao; and Takeuchi, Kazuo, 4,059,692, Cl. 424-177.000.

Takezaki, Tsuneo: *See*—
Serizawa, Masabumi; and Takezaki, Tsuneo, 4,059,791, Cl. 363-37.000.

Takida, Hiroshi; Kido, Akio; and Takahashi, Masazumi, to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha. Process for drying wet particles of hydrolyzed ethylene-vinyl acetate copolymer. 4,058,904, Cl. 34-12.000.

Tallon, James L., to McNeil Corporation. Wheel disk display and placard holder. 4,058,917, Cl. 40-125.00M.

Tamaru, Munetaka; Kume, Kazunari; Oono, Hideshi; Watanabe, Minoru; Sato, Hideo; and Morokawa, Shigeru, to Citizen Watch Co., Ltd. Electric timepiece for displaying the operating condition thereof. 4,058,969, Cl. 58-23.0BA.

Tamura, Tetsuomi: *See*—
Tateno, Hidenori; and Tamura, Tetsuomi, 4,059,088, Cl. 123-103.00R.
Tan, Sing Liong: *See*—
van de Polder, Leendert Johan; and Tan, Sing Liong, 4,059,840, Cl. 358-48.000.
Tanaka, Akira, to American Safety Equipment Corporation. Safety belt retractor. 4,059,242, Cl. 242-107.40A.
Tanaka, Kunthiko: *See*—
Hosaka, Hirokazu; Tanimoto, Kenji; Okabe, Hiromichi; Tanaka, Kunthiko; Ueda, Yuji; and Dohgane, Iwao, 4,059,637, Cl. 260-610.00A.
Tanaka, Masayuki: *See*—
Hosokoshi, Kakuichiro; Yamamoto, Hikoshi; Tanaka, Masayuki; and Omura, Shinichi, 4,059,834, Cl. 354-1.000.
Tanaka, Wataru; Akito, Eiichiro; Yoshida, Koichi; Terada, Takashi; and Ninomiya, Hiroshi, to Nippon Kayaku Kabushiki Kaisha. Pharmaceutical preparation for oral cavity administration. 4,059,686, Cl. 424-19.000.
Tanaka, Yoshiaki: *See*—
Handa, Susumu; Tanaka, Yoshiaki; Nishibata, Atsushi; Ueda, Sadashi; Inamoto, Yoshiaki; Saito, Masahiro; Tanimoto, Fumio; and Kitano, Hisao, 4,059,610, Cl. 544-193.000.
Tanazawa, Hisaji. Method of forming an embossed pattern. 4,059,479, Cl. 156-640.000.
Tanigami, Takahiko; Hasegawa, Akira; and Horikoshi, Shigeru, to Hitachi, Ltd. Oil pressure detecting apparatus for internal combustion engines. 4,059,087, Cl. 123-196.00S.
Tanimoto, Fumio: *See*—
Handa, Susumu; Tanaka, Yoshiaki; Nishibata, Atsushi; Ueda, Sadashi; Inamoto, Yoshiaki; Saito, Masahiro; Tanimoto, Fumio; and Kitano, Hisao, 4,059,610, Cl. 544-193.000.
Tanimoto, Kenji: *See*—
Hosaka, Hirokazu; Tanimoto, Kenji; Okabe, Hiromichi; Tanaka, Kunthiko; Ueda, Yuji; and Dohgane, Iwao, 4,059,637, Cl. 260-610.00A.
Tanimura, Kiyotaka. Automotive light for preventing rear end collision. 4,059,824, Cl. 340-71.000.
Tanner, Lee E.: *See*—
Ray, Ranjan; Tanner, Lee E.; and Cline, Carl F., 4,059,441, Cl. 75-174.000.
Tardivel, Jacques, to Societe Degremont. Automatic sludge extraction and washing device for use in a water treatment settling apparatus. 4,059,531, Cl. 210-522.000.
Tart, David K.; and Osteen, Mitchell M., to General Electric Company. Gasket material and method of making. 4,059,753, Cl. 362-267.000.
Tateno, Hidenori; and Tamura, Tetsuomi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Throttle positioner. 4,059,088, Cl. 123-103.00R.
Tatsuta, Hatsumi; and Kumazawa, Shigeru, to Japan Atomic Energy Research Institute. Gamma-ray scintillation detector. 4,059,765, Cl. 250-367.000.
Taylor, Gary Newton: *See*—
Kahn, Frederic Jay; and Taylor, Gary Newton, 4,059,340, Cl. 350-160.0LC.
Taylor, Timothy H.: *See*—
Smith, Edward M.; Casada, James H.; and Taylor, Timothy H., 4,059,161, Cl. 172-60.000.
Teague, Willis E.: *See*—
Henry, J. R.; and Teague, Willis E., 4,058,872, Cl. 17-1.00R.
Tecumseh Products Company: *See*—
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Teijin Limited: *See*—
Hori, Kikuo; Horiuchi, Takumi; Nishikawa, Mikio; Ryugo, Shiro; Ishizuka, Akira; and Takenaka, Yoshisuke, 4,059,239, Cl. 242-18.100.
Iimuro, Hiroyuki; Horiuchi, Takumi; Kuroda, Yoji; Hori, Kikuo; and Kawano, Tatumi, 4,058,967, Cl. 57-140.00J.
Tomibe, Katsuhiko; Masuho, Yasuhiko; Matsuzawa, Kimihiko; Ishimoto, Sachio; Satake, Kazuo; and Watanabe, Tsuneo, 4,059,571, Cl. 260-112.00B.
Teissier, Etienne Leon Norbert, to Etat Francais Represente par de Delegue Ministeriel pour l'Armement. Device for mechanical connection. 4,059,360, Cl. 403-2.000.
Teldix GmbH: *See*—
Jonner, Wolf-Dieter, 4,059,312, Cl. 303-92.000.
Tenneco Chemicals, Inc.: *See*—
Hoch, Samuel; Ceprini, Mario Q.; and Szabo, Emery, 4,059,562, Cl. 260-45.75S.
Terada, Haruyoshi: *See*—
Nishijima, Masanori; Oda, Nobuyuki; and Terada, Haruyoshi, 4,059,452, Cl. 106-14.000.
Terada, Takashi: *See*—
Tanaka, Wataru; Akito, Eiichiro; Yoshida, Koichi; Terada, Takashi; and Ninomiya, Hiroshi, 4,059,686, Cl. 424-19.000.
Terai, Kiyoshi: *See*—
Yoshida, Toshio; Terai, Kiyoshi; Matsui, Shigetomo; Kinoshita, Tsuneo; Hoshi, Akira; and Tohmoto, Toru, 4,058,883, Cl. 29-448.000.
Terrell, Ross C., to Airco, Inc. Ether compounds. 4,059,639, Cl. 260-614.00F.
Terry, Ruel C., to In Situ Technology, Inc. Methods of fluidized production of coal in situ. 4,059,151, Cl. 166-258.000.
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Lendi, Georges; Hardegger, Bruno; and De Trey, Rene, 4,058,901, Cl. 33-178.00R.
Texaco Development Corporation: *See*—
Gipson, Robert Malone, 4,059,599, Cl. 260-348.290.
Johnson, Fred Lowery, Jr., 4,059,620, Cl. 260-513.00T.
Texaco Inc.: *See*—
Allen, Joseph C.; and Shum, Yick-Mow, 4,059,152, Cl. 166-261.000.
Braden, William B., Jr.; and Flourny, Kenoth H., 4,059,154, Cl. 166-274.000.
Harrison, Robert J., 4,059,149, Cl. 166-64.000.
Texas Instruments Incorporated: *See*—
Belasco, Melvin; and Cottongim, Billie Joe, 4,059,764, Cl. 250-352.000.
Rogers, Gerald D., 4,059,826, Cl. 365-104.000.
Textile Research Institute: *See*—
Miller, Bernard; Martin, J. Ronald; Meiser, Charles H., Jr.; Lambert, Harold W.; and Buvel, Harry, 4,059,007, Cl. 73-190.00R.
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Theelen, Hubertus J.: *See*—
Koel, Maarten; and Theelen, Hubertus J., 4,059,848, Cl. 361-272.000.
Thomas, Ian M., to Owens-Illinois, Inc. Method of making aluminum phosphate. 4,059,669, Cl. 264-319.000.
Thompson, Morice William: *See*—
Bentley, John; and Thompson, Morice William, 4,059,557, Cl. 260-31.20N.
Thomson-Brandt: *See*—
Bricot, Claude; and Lehureau, Jean-Claude, 4,059,841, Cl. 358-128.000.
Thomson-CSF: *See*—
Agnus, Pierre; and Butin, Henri, 4,059,804, Cl. 328-134.000.
Cahen, Olivier, 4,059,774, Cl. 307-299.00R.
Nicolas, Jean; Lagrange, Alain; and Hildebrandt, Nieczyslaw, 4,059,664, Cl. 264-66.000.
Rougeot, Henri, 4,059,766, Cl. 250-370.000.
Thorne, John K., to Universal Oil Products Company. Integral finned tube for submerged boiling applications having special O.D. and/or I.D. enhancement. 4,059,147, Cl. 165-133.000.
Threadgill, Murray H. Sleep alarm device. 4,059,830, Cl. 340-279.000.
Thurau, Gunther: *See*—
Magg, Alfred; and Thurau, Gunther, 4,059,178, Cl. 192-53.00F.
Tiitola, Antti-Jussi, to Karhu-Titan Oy. Hockey stick or the like, particularly blade structure thereof. 4,059,269, Cl. 273-67.00A.
Tile Council of America, Inc.: *See*—
Weiant, Davis S.; Bernett, Frank E.; and Velivis, William R., 4,059,551, Cl. 260-29.60H.
Tillgren, Gunnar Kurt Arne, to Personer Verkstad, AB. Method and a device for a bale press. 4,059,049, Cl. 100-41.000.
Timex Corporation: *See*—
Wuthrich, Paul; and Flumm, Paul, 4,059,110, Cl. 128-218.00A.
Timms, Ralph G., to British Steel Corporation. Coated products. 4,059,472, Cl. 156-259.000.
Tioga Air Heaters, Co.: *See*—
Muckelrath, Ernest R., 4,058,882, Cl. 29-407.000.
Tirp, Erwin: *See*—
Schliek, Gunter; and Tirp, Erwin, 4,059,044, Cl. 93-93.0HT.
Tischlinger, Edward A. Mixing and dispensing disposable medicament injector. 4,059,109, Cl. 128-218.00M.
Tischlinger, Edward A. Disposable additive syringe. 4,059,112, Cl. 128-272.300.
Tohmoto, Toru: *See*—
Yoshida, Toshio; Terai, Kiyoshi; Matsui, Shigetomo; Kinoshita, Tsuneo; Hoshi, Akira; and Tohmoto, Toru, 4,058,883, Cl. 29-448.000.
Tohyama, Masao; Ichigo, Minoru; Suzuki, Takeshi; Nakasu, Makoto; Ando, Akinobu; Yoshida, Akitoshi; Kosaka, Masaharu; Hayasi, Norihisa; and Inoue, Shigeki, to Kikusui Kagaku Kogyo Kabushiki Kaisha; and Nissan Kagaku Kogyo Kabushiki Kaisha. Coating composition comprising oxides and/or hydroxides of Mg^{++}, Ca^{++}, chromium, manganese, and Zn^{++} and quaternary ammonium silicates useful for building materials. 4,059,553, Cl. 260-29.60S.
Tojyo, Tsutomu, to Olympus Optical Co., Ltd. Microscope objective with correcting means. 4,059,342, Cl. 350-175.0ML.
Tokiwa, Taisuke: *See*—
Kitamura, Takashi; Watanabe, Asao; Nakano, Takashi; Masaki, Katsumi; Hirayama, Kazuhiro; Sato, Yasushi; and Tokiwa, Taisuke, 4,059,833, Cl. 346-108.000.
Tolbert, William R.; and Feder, Joseph, to Monsanto Company. Adaptation of cell lines to suspension culture. 4,059,485, Cl. 195-1.800.
Tolbert, William R., to Monsanto Company. Cell culture process. 4,059,486, Cl. 195-1.800.
Tomczak, Lawrence William; Crall, Frederick William; Caron, LaVerne Andrew; and Campau, Walter Joseph, to Chrysler Corporation. Method of calibrating variable inductance transducers. 4,058,888, Cl. 29-593.000.
Tomibe, Katsuhiko; Masuho, Yasuhiko; Matsuzawa, Kimihiko; Ishimoto, Sachio; Satake, Kazuo; and Watanabe, Tsuneo, to Teijin Limited. Novel immunoglobulin derivatives and process for the preparation thereof. 4,059,571, Cl. 260-112.00B.
Tonkyn, Richard G.: *See*—
Fowler, William J.; Heberle, Richard A.; Tonkyn, Richard G.; and Vorchheimer, Norman, 4,059,515, Cl. 210-51.000.
Toomay, Timothy L., to Hewlett-Packard Company. Clutchless paper advance mechanism. 4,059,213, Cl. 226-151.000.
Topel, Kenneth D.: *See*—
Rasmussen, Harry R.; and Topel, Kenneth D., 4,059,321, Cl. 339-34.000.

Torimaru, Takashi, to Hokushin Electric Works, Ltd. Electromagnetic flowmeter. 4,059,014, Cl. 73-194.0EM.

Tornell, Charles B. Device for prying loose a pressure cooker cover. 4,059,032, Cl. 81-3.00R.

Toro Company, The: *See—*
Hunter, Edwin J., 4,059,227, Cl. 239-1.000.

Torre, Edward Della: *See—*
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Torstenfelt, Ragnar: *See—*
Ferm, Stig; and Torstenfelt, Ragnar, 4,058,973, Cl. 60-39.09R.

Torstensson, Bengt-Arne. Method and device for pore pressure sounding. 4,059,008, Cl. 73-38.000.

Toshioka, Toru; Oishi, Kazuo; and Yamada, Takashi, to Toyota Jidosha Kogyo Kabushiki Kaisha; and Nippon Soken, Inc. Fault detecting system for vehicle occupants protective apparatus. 4,059,822, Cl. 340-52.00H.

Touborg, Jorn, to F. L. Smidth & Co. Calcination of pulverous material. 4,059,392, Cl. 432-58.000.

Touw, Antonius Cornelis Maria: *See—*
Van Eck, Rudolf; and Touw, Antonius Cornelis Maria, 4,059,850, Cl. 364-200.000.

Tower Manufacturing Corporation: *See—*
Mongeau, Roland E., 4,059,738, Cl. 200-6.00B.

Towmotor Corporation: *See—*
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Toyoda-Koki Kabushiki-Kaisha: *See—*
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Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
Kasima, Osamu; and Sanda, Shougo, 4,059,079, Cl. 123-30.00D.
Kayanuma, Nobuaki, 4,059,081, Cl. 123-136.000.
Morita, Akiyoshi; Hayasaka, Tamio; Shimizu, Kunio; and Fukuda, Tokiharu, 4,059,143, Cl. 164-113.000.
Tateno, Hidenori; and Tamura, Tetsuomi, 4,059,088, Cl. 123-103.00R.
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Tozier, John E.: *See—*
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Ilmaier, Bernard; and Zeiringer, Hans, 4,059,417, Cl. 51-309.00A.

Tresper, Erhard: *See—*
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Trippel, Gerhard: *See—*
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Trodler, Juergen W.: *See—*
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Trosch, Paul: *See—*
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Trukhin, Alexandr Fedorovich: *See—*
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Truth Incorporated: *See—*
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TRW Inc.: *See—*
Dawson, John Myrick, 4,059,761, Cl. 250-287.000.
Pearson, Durk J.; and Bohn, Jack R., 4,059,308, Cl. 299-5.000.

Tsubouchi, Haruyoshi, to Hitachi, Ltd. Fuel and lubricating oil supply device. 4,059,086, Cl. 123-196.00R.

Tsuchihashi, Kiyoshi: *See—*
Inamoto, Yoshiaki; Fujikura, Yoshiaki; Tsuchihashi, Kiyoshi; and Kashihara, Eiji, 4,059,643, Cl. 260-666.0PY.

Tsuji, Masanobu: *See—*
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Tsukiyasu, Tadashi: *See—*
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Tsukushi, Masanori: *See—*
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Tsutsumi, Shigeru. Mold opening and locking mechanism in an injection molding machine or the like. 4,059,383, Cl. 425-451.600.

Tsygulev, Leonid Nikiforovich: *See—*
Movshovich, Pavel Mikhailovich; Khavkin, Viktor Pavlovich; Maximov, Gennady Konstantinovich; Babushkina, Natalya Borisovna; Baranov, Alexandr Anatolievich; Ivanov, Lev Nikolaevich; Nezelenov, Sergei Vladimirovich; Shutov, Gennady Nikolaevich; Tsygulev, Leonid Nikiforovich; and Ilin, Vadim Sergeevich, 4,058,960, Cl. 57-34.0AT.

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Turpening, Roger M., to Environmental Research Institute of Michigan. Seismic wave generator and method of geophysical prospecting using the same. 4,059,820, Cl. 340-15.5SW.

Tyrspy Inc.: *See—*
Martin, Clyde J.; and Nicholson, Floyd A., 4,059,823, Cl. 340-58.000.

Tysver, Oliver J.: *See—*
Aschberger, Anton A.; Avery, Jack L.; Cartwright, William J.; Dean, Geoffrey J.; Tysver, Oliver J.; Wolfe, Robert W.; and Bautz, Frederick H., 4,059,186, Cl. 198-481.000.

Uchino, Hisanori; Takada, Masamichi; Shimizu, Takahiro; Shibayama, Masamitsu; and Furuno, Fumiya, to Hokushin Electric Works, Ltd. System for controlling a power shovel. 4,059,196, Cl. 214-138.00R.

Ueda, Sadashi: *See—*
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Ueda, Yuji: *See—*
Hosaka, Hirokazu; Tanimoto, Kenji; Okabe, Hiromichi; Tanaka, Kunthiko; Ueda, Yuji; and Dohgane, Iwao, 4,059,637, Cl. 260-610.00A.

Ueno, Yukichi: *See—*
Nakaizumi, Yasushi; Ueno, Yukichi; and Okumura, Masahide, 4,059,783, Cl. 315-107.000.

Ueno, Zene: *See—*
Kosaka, Katuaki; and Ueno, Zene, 4,059,076, Cl. 123-3.000.
Kosaka, Katuaki; Wagatsuma, Fumio; Shimomoto, Mithuo; Harada, Osamu; and Ueno, Zene, 4,059,415, Cl. 48-63.000.

Ueshima, Takashi: *See—*
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Ugine Carbone: *See—*
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Ulin, Carl-Otto: *See—*
Gustafsson, Lars Ake Olof; and Ulin, Carl-Otto, 4,059,182, Cl. 197-1.00R.

Umemura, Masashi: *See—*
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Union Carbide Canada Limited: *See—*
Morro, William Charles; Hakka, Leo Ernest; Brophy, James Mackay; Hebrard, Michel Jacques Roger; and Courtes, Jean Claude, 4,059,534, Cl. 252-32.70E.

Union Carbide Corporation: *See—*
Anderson, John Erling, 4,059,252, Cl. 266-236.000.
Bennett, Everett W., 4,059,605, Cl. 260-448.20B.
Prokai, Bela, 4,059,581, Cl. 544-69.000.
Reedy, James Dale; and Barker, Thomas Harold, 4,059,607, Cl. 260-448.20E.

Union Special Corporation: *See—*
Specht, Thomas F.; Trodler, Juergen W.; and Vanecek, Pavel, 4,059,173, Cl. 188-110.000.

Uniroyal, S.A.: *See—*
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United Resources Industry Co., Ltd.: *See—*
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United States Gypsum Company: *See—*
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U.S. Industries, Inc.: *See—*
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United States of America
Air Force: *See—*
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Army: *See—*
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McCuaig, Franklin D., 4,059,439, Cl. 75-122.700.
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U.S. Philips Corporation: *See—*
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Koel, Maarten; and Theelen, Hubertus J., 4,059,848, Cl. 361-272.000.
van Alphen, Willem Meijndert; and Verweel, Jan, 4,059,781, Cl. 313-403.000.
van de Polder, Leendert Johan; and Tan, Sing Liong, 4,059,840, Cl. 358-48.000.
Van Eck, Rudolf; and Touw, Antonius Cornelis Maria, 4,059,850, Cl. 364-200.000.
Witterick, Petrus Johannes Julius; and Sieben, Joannes Henricus Franciscus, 4,059,387, Cl. 431-93.000.

United States Steel Corporation: *See—*
Bryson, Roy E., 4,059,506, Cl. 209-18.000.
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United Technologies Corporation: *See—*
Markowski, Stanley J.; and Nolan, James J., 4,058,977, Cl. 60-39.650.

Universal Oil Products Company: *See*—
Thorne, John K., 4,059,147, Cl. 165-133.000.
University of Delaware, The: *See*—
Austin, Paul Rolland, 4,059,457, Cl. 106-203.000.
University of Hawaii, The: *See*—
Norton, Ted R.; Shibata, Shoji; and Kashiwagi, Midori, 4,059,694, Cl. 424-177.000.
University of Iowa Research Foundation: *See*—
Funk, David C., 4,058,910, Cl. 35-17.000.
University of Rochester: *See*—
Kende, Andrew S.; and Liebeskind, Lanny S., 4,059,593, Cl. 260-340.50R.
University Patents, Inc.: *See*—
Stewart, John M., 4,059,693, Cl. 424-177.000.
Untch, Karl G.: *See*—
Nelson, Peter H.; and Untch, Karl G., 4,059,611, Cl. 260-456.00P.
Upjohn Company, The: *See*—
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USM Corporation: *See*—
Duncan, Robert John; and Elliott, Richard Montgomery, 4,059,204, Cl. 222-146.0HE.
Ellwood, Henry, 4,059,206, Cl. 222-413.000.
Meyer, Engelbert Anthony, 4,059,301, Cl. 293-62.000.
Vacu-Blast Limited: *See*—
John, Ronald, 4,059,189, Cl. 209-112.000.
Vagt, Henry Tyrrell, Jr., to Singer Company, The. Pulse position demodulator circuit. 4,059,806, Cl. 329-107.000.
Valentine, Richard E.: *See*—
Maul, John A.; and Valentine, Richard E., 4,059,051, Cl. 101-45.000.
Vallee, Louis Leonce. Integrated sheet metal roofing system. 4,058,950, Cl. 52-461.000.
Valmet Oy: *See*—
Kankaanpaa, Matti; Nylund, Ragnar; and Reijonen, Yrjo, 4,059,482, Cl. 162-281.000.
van Alphen, Willem Meijndert; and Verweel, Jan, to U.S. Philips Corporation. Shadow mask each aperture of which is defined by a quadrupolar lens. 4,059,781, Cl. 313-403.000.
Vanassche, Willy Joseph; Pattyn, Herman Alberik; Moisar, Erik; and Klotzer, Sieghart, to AGFA-GEVAERT N.V. Direct positive silver halide elements. 4,059,450, Cl. 96-101.000.
van de Polder, Leendert Johan; and Tan, Sing Liong, to U.S. Philips Corporation. Television camera and pick-up tube having stripes for improved resolution and linearity. 4,059,840, Cl. 358-48.000.
Vanderbusse, Robert, to Siemens Aktiengesellschaft. Method for transferring data into a data input during a telephone connection established over an interoffice trunk. 4,059,734, Cl. 179-18.0BD.
van der Lely, Ary; and Bom, Cornelis Johannes Gerardus, to C. van der Lely N. V. Rotary harrows. 4,059,160, Cl. 172-47.000.
Vanecek, Pavel: *See*—
Specht, Thomas F.; Trodler, Juergen W.; and Vanecek, Pavel, 4,059,173, Cl. 188-110.000.
Van Eck, Rudolf; and Touw, Antonius Cornelis Maria, to U.S. Philips Corporation. Memory system word group priority device with least-recently used criterion. 4,059,850, Cl. 364-200.000.
Van Huis, Robert L.; and Carten, Charles T., to U.S. Industries, Inc. Poultry cage system with controlled feeder. 4,059,071, Cl. 119-18.000.
Van Klompenburg, Marlo G., to Truth Incorporated. Window lock. 4,059,298, Cl. 292-199.000.
Van Landeghem, Willy Karel; and Suys, Andre Roger, to AGFA-GEVAERT N.V. Radiographic intensifying screens. 4,059,768, Cl. 250-483.000.
Vann, Donald S. Recessed electrical outlet. 4,059,327, Cl. 339-122.00R.
Van Rossen, Antoine Roberta: *See*—
Hazenbosch, Edwin Hendrik; Van Rossen, Antoine Roberta; Beels, Roland Francois; and Aelterman, Marcel Frans, 4,059,446, Cl. 96-50.00R.
Vasiliev, Vladimir Sergeevich; Livshits, Abram Lazarevich; Polotsky, Vadim Evgenievich; and Zlatkin, Yakov Iosifovich. Device for automatically controlling an electroerosion cutting machine. 4,059,788, Cl. 318-577.000.
Vassallo, Emmanuel; and Vassallo, Helen I. Automatic aquarium lighting and fish feeding device. 4,059,072, Cl. 119-51.130.
Vassallo, Helen I.: *See*—
Vassallo, Emmanuel; and Vassallo, Helen I., 4,059,072, Cl. 119-51.130.
Vaughan, Joe Larry: *See*—
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Ventavoli, Roger: *See*—
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Vernon, Philip L.: *See*—
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Ver Planck, Peter: *See*—
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Verweel, Jan: *See*—
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Verwys, John H.: *See*—
Nutter, Roy S., Jr.; Washburn, Jerry R.; and Verwys, John H., 4,059,851, Cl. 364-200.000.
Vestergaard, Bent, to Kosan A/S. Cultivation block and a method for the manufacturing of same. 4,058,931, Cl. 47-87.000.
Viannay, Stephane Georges Jean-Marie: *See*—
Cellier, Michel Jean Jacques; Guitton, Jean-Claude; Scholle, Jean-Claude; and Viannay, Stephane Georges Jean-Marie, 4,059,399, Cl. 432-121.000.
Vibrodyne, Inc.: *See*—
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Vincent, Michel; Remond, Georges; and Laubie, Michel, to Science Union et Cie, Societe Francaise de Recherche Medicale. Substituted benzamido propanolamines. 4,059,621, Cl. 260-558.00R.
Violette, Theodore T. Mobile drum filling assembly. 4,059,134, Cl. 141-59.000.
Violino, Ettore, to Ing. C. Olivetti & C., S.p.A. Computer accounting system. 4,059,748, Cl. 235-303.100.
Vockenhuber, Karl: *See*—
Schild, Josef, 4,059,350, Cl. 352-141.000.
Vogel, Walter H., to Redington, Incorporated. Method of feeding a leaflet and the apparatus therefor. 4,059,264, Cl. 271-270.000.
Vogt, Kurt. Machine for winding containers. 4,059,238, Cl. 242-7.210.
Vogt, Wilhelm: *See*—
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Volkommer, Norbert: *See*—
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Grundmann, Edgard; Heitland, Herbert; and Kroll, Rudolf, 4,059,095, Cl. 126-271.000.
Otto, Heinz; and Ilsemann, Bernhard, 4,059,286, Cl. 280-673.000.
von Allworden, Wilhelm, to Jean Walterscheid GmbH. Device for supporting the drive shaft of an agricultural machine for coupling to a power take-off shaft. 4,058,990, Cl. 64-1.00S.
Von Bodungen, George A.; and Meredith, Curtis L., to Copolymer Rubber & Chemical Corporation. Thermoplastic elastomer blend of EPDM, polyethylene, and a C_3–C_{16} polyolefin and method. 4,059,654, Cl. 260-897.00A.
Vorchheimer, Norman: *See*—
Fowler, William J.; Heberle, Richard A.; Tonkyn, Richard G.; and Vorchheimer, Norman, 4,059,515, Cl. 210-51.000.
Vroom, Henry J.: *See*—
Knowles, Gregory W.; Sangesland, Odd E.; Vroom, Henry J.; and Madey, Robert W., 4,059,093, Cl. 126-271.000.
W. R. Grace & Co.: *See*—
Gaudette, Roger Robert; Ohlson, John Leonard; and Scanlon, Patricia Marie, 4,059,548, Cl. 260-251.00R.
Sanborn, Philip A., Jr.; Westbrook, Shelby F.; and Sullivan, Donald A., 4,058,953, Cl. 53-22.00A.
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Raasch, Hans, 4,058,966, Cl. 57-78.000.
Waack, Carl L.; and Giss, Alador J., to Massey-Ferguson Inc. Speed control. 4,059,025, Cl. 74-482.000.
Wacker-Chemie GmbH: *See*—
Burkhardt, Jurgen; Hittmair, Paul; and Wegehaupt, Karl-Heinrich, 4,059,559, Cl. 260-448.20E.
Eck, Herbert; Weinhold, Gunter; and Hannebaum, Manfred, 4,059,661, Cl. 264-54.000.
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Kosaka, Katuaki; Wagatsuma, Fumio; Shimomoto, Mithuo; Harada, Osamu; and Ueno, Zene, 4,059,415, Cl. 48-63.000.
Wakabayashi, Yasuo. Segment type, electric light alpha-numeric figure indicator. 4,058,919, Cl. 40-130.00E.
Wald, Milton M.; and Kim, Leo, to Shell Oil Company. Process for producing triptane by contacting methanol or dimethyl ether with zinc bromide. 4,059,646, Cl. 260-676.00R.
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Waldmann, Helmut: *See*—
Prescher, Gunter; Schreyer, Gerd; Weiberg, Otto; Wirthwein, Rolf; Waldmann, Helmut; Seifert, Hermann; Schwerdtel, Wulf; and Swodenk, Wolfgang, 4,059,619, Cl. 260-502.00R.
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Walker, Keith A. M., to Syntex (U.S.A.) Inc. Derivatives of substituted n-alkyl imidazoles. 4,059,705, Cl. 424-273.00R.
Wallace, Richard B., to Oakland Corporation, The. Thread lock. 4,059,136, Cl. 151-14.500.
Wallander, Bengt Olof Henrik, to Conort Engineering AB. Multi-engine assembly. 4,059,027, Cl. 74-718.000.
Walsingham, Richard Warren; and Stuart, Ronald Sangster, to Imperial Chemical Industries Limited. Organosilicon compounds. 4,059,606, Cl. 260-448.20B.
Walter, Lothar: *See*—
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Warmka, Gary Paul, to Control Data Corporation. Linear motor. 4,059,775, Cl. 310-12.000.
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Warren Insulated Bloc, Inc.: *See*—
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Warren, Millard R., to Warren Insulated Bloc, Inc. Insulated masonry block. 4,058,948, Cl. 52-405.000.
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Washburn, Jerry R.: *See*—
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Waskiewicz, John J.; and Winston, John H., to Outboard Marine Corporation. Apparatus and method for uniform powder feed. 4,059,310, Cl. 302-42.000.
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Watanabe, Yoshihisa: *See*—
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Watson, Hugh R.; Rowsell, David G.; and Browning, John H. D., to Wilkinson Sword Limited. Tobacco and tobacco-containing manufactures containing an ingredient having physiological cooling activity. 4,059,118, Cl. 131-8.00R.
Watson, Jimmie L.; and Carney, Leroy L., to Halliburton Company. Oxygen scavenging methods and additives. 4,059,533, Cl. 252-8.50A.
Watters, Bill G.; Nacey, Michael; and Horrall, Thomas R., to Bolt Beranek and Newman, Inc. Process and apparatus for speech privacy improvement through incoherent masking noise sound generation in open-plan office spaces and the like. 4,059,726, Cl. 179-1.50M.
Webb, Paul D.: *See*—
McGahan, Wallace A.; Webb, Paul D.; and Morse, Henry W., 4,059,368, Cl. 417-243.000.
Weber, Erich. Apparatus for drying flat printed material. 4,058,908, Cl. 34-149.000.
Weber, Kurt, to Rieter Machine Works, Ltd. Apparatus for supplying spinning preparatory machines with cans or the like. 4,059,185, Cl. 198-339.000.
Webster, Gordon A.: *See*—
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Weiant, Davis S.; Bernett, Frank E.; and Velivis, William R., to Tile Council of America, Inc. Mortar compositions. 4,059,551, Cl. 260-29.60H.
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Weick, Heinz Hermann. Wristwatch having a perfume chamber. 4,058,972, Cl. 58-88.00E.
Weidler, Jay B., Jr.; and Stelly, Charles Warren, to Brown & Root, Inc. Marine cushioning unit. 4,058,984, Cl. 61-48.000.
Weigert, Frank Julian: *See*—
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Weil, Edward D., to Hooker Chemicals & Plastics Corporation. Side chain halogenated alkylphenyl haloformates and derivatives. 4,059,615, Cl. 560-132.000.
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Weisbach, Jerry A.: *See*—
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Weismueller, Sr. William A.: *See*—
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Weissmann, Gerd, to Bayerisches Leichtmetallwerk Graf Blucher von Wahlstatt KG. Forging process. 4,059,214, Cl. 228-265.000.
Weman, Per Olaf, to Sigmatex, A.G. Safety belt for motor vehicles. 4,059,287, Cl. 280-745.000.
Weniger, Robert W. Board game. 4,059,276, Cl. 273-134.00D.
Werner, David, to Salco Products, Inc. Self cleaning, pressure responsive emitter valve for soil irrigation. 4,059,228, Cl. 239-106.000.
Wesley, John George, to Labelette Company. Box end labeling apparatus. 4,059,477, Cl. 156-479.000.
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Feilchenfeld, Michal M., 4,059,749, Cl. 235-302.000.
Meacham, James H., 4,059,842, Cl. 358-150.000.
Mitchell, James T., 4,059,849, Cl. 361-395.000.
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Wheeler, Howard R., to Nelson McCoy Pottery Company. Scrubbing apparatus for pottery greenware. 4,058,869, Cl. 15-101.000.
White, Joe L.: *See*—
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Whiteley, Eric, to Canadian General Electric Company Limited. Cooling of discoidal dynamoelectric machines. 4,059,777, Cl. 310-64.000.
Whyatt, Roy. Object retaining and display calendar. 4,058,916, Cl. 40-107.000.
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Wieder, Horst K.; and Wieder, Klaus A. Elastic pull-type exerciser. 4,059,265, Cl. 272-137.000.
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Wilkerson, Alan W. Waste energy source utilization circuit and method. 4,059,772, Cl. 307-46.000.
Wilkerson, Edward D. Wheel base, tracking and frame analyzer. 4,058,903, Cl. 33-288.000.
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Wilkinson Sword Limited: *See*—
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Willard, John Wesley, Sr., to Caw Industries, Inc. Method of reducing the incidence of infectious diseases and relieving stress in livestock. 4,059,691, Cl. 424-155.000.
Wilwerding, Dennis J., to Honeywell Inc. Focus control system with dual scan. 4,059,756, Cl. 250-201.000.
Wilwerding, Dennis J., to Honeywell Inc. Focus system for movie cameras. 4,059,757, Cl. 250-201.000.
Wilwerding, Dennis J., to Honeywell Inc. Autofocus system. 4,059,758, Cl. 250-201.000.
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Winkley, Donald Charles, to FMC Corporation. Stabilization of iron-containing acidic hydrogen peroxide solutions. 4,059,678, Cl. 423-273.000.
Winston, John H.: *See*—
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Winter, Robert: *See*—
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Winzer, Gerhard; and Rauscher, Walter, to Siemens Aktiengesellschaft. Optical coupling devices. 4,059,337, Cl. 350-96.00C.
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Wisotsky, Harry A. Hand-held film projectors. 4,059,351, Cl. 353-43.000.
Wistinghausen, Walter. Electric motor and brake arrangement. 4,059,779, Cl. 310-77.000.
Witterick, Petrus Johannes Julius; and Sieben, Joannes Henricus Franciscus, to U.S. Philips Corporation. Flash lamp unit. 4,059,387, Cl. 431-93.000.
Wittwer Construction Company: *See*—
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Wolf, Anthony David, to Du Pont de Nemours, E. I., and Company. Cycloalkanapyrazole herbicides. 4,059,434, Cl. 71-92.000.
Wolf, Gerhard Dieter; Miessen, Ralf; Kunzel, Hans Egon; and Bentz, Francis, to Bayer Aktiengesellschaft. Process for dyeing wet-spun aromatic polyamides in gel form. 4,059,403, Cl. 8-168.00B.
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Wolfrum, Gerhard; Kuhnel, Werner; Klauke, Erich; and Buttner,

Gerhard, to Bayer Aktiengesellschaft. Transfer printing process. 4,059,402, Cl. 8-2.50A.
Woodward, James R., to Rohr Industries, Incorporated. Superalloy liquid interface diffusion bonding. 4,059,217, Cl. 228-181.000.
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Wright, Ralph Wallace. Modular heating section. 4,058,982, Cl. 61-1.00R.
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Wurster, Winfried; Kuhne, Jochen; and Frodermann, Gerd, to Klockner-Humboldt-Deutz Aktiengesellschaft. Method and apparatus for extracting gas samples of high temperature gases, particularly for cement rotary kiln furnace exhaust gases. 4,059,019, Cl. 73-421.50A.
Wuthrich, Paul; and Flumm, Paul, to Timex Corporation. Clockwork driven hypodermic syringe. 4,059,110, Cl. 128-218.00A.
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Cocksedge, Kenneth W., 4,059,789, Cl. 318-608.000.
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Lu, Chin H.; and Parent, Richard A., 4,059,444, Cl. 96-1.0LY.
Okumura, Koji, 4,059,443, Cl. 96-1.0PS.
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Yamaguchi, Yoshinobu; Kitano, Nanahiko; Watanabe, Yoshihisa; and Imanari, Makoto, to Fujimi Kenmazai Kogyo Kabushiki Kaisha; and Mitsubishi Petrochemical Co., Ltd. Active material compositions with porous protective sheath and method for preparing. 4,059,544, Cl. 252-471.000.
Yamamoto, Hikoshi: *See*—
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Yamanaka, Akira, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Energy absorbing apparatus for vehicles. 4,059,304, Cl. 296-35.00R.
Yamanaka, Seisuke; and Nagumo, Fumio, to Sony Corporation. Solid state camera. 4,059,839, Cl. 358-44.000.
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Yamasita, Nobuo, to Olympus Optical Co., Ltd. Retrofocus-type objective for endoscopes. 4,059,344, Cl. 350-220.000.
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Yamazaki, Noboru; and Higashi, Fukuji, to Sumitomo Chemical Company, Limited. Esterification of carboxylic acids by contact with a phosphonium salt. 4,059,603, Cl. 260-408.000.
Yamazaki, Tatsuo; Hayashida, Takemi; and Sakuma, Masatoshi, to Kanro Co. Ltd. Apparatus for manufacturing a snack food whose raw material is fruitage or vegetables. 4,059,046, Cl. 99-355.000.
Yanagida, Kiyomi; Hirokane, Tadashi; Tsukiyasu, Tadashi; and Sato, Tomoari, to Sumitomo Aluminum Smelting Co., Ltd. Process for continuous electrolytic coloring of aluminum or aluminum base alloy strip and wire. 4,059,494, Cl. 204-28.000.
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Yang, Kang; Reedy, James D.; and Scamehorn, John F., to Continental Oil Company. Decomposition of halogenated organic compounds. 4,059,675, Cl. 423-240.000.
Yang, Kang; and Reedy, James D., to Continental Oil Company. Decomposition of halogenated organic compounds. 4,059,676, Cl. 423-240.000.
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Yonemitsu, Eiichi; Isshiki, Tomiya; and Kijima, Yasuhiko, to Mitsubishi Gas Chemical Company, Inc. Process for preparing adenine. 4,059,582, Cl. 260-252.000.
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Yoshida, Toshio; Terai, Kiyoshi; Matsui, Shigetomo; Kinoshita, Tsuneo; Hoshi, Akira; and Tohmoto, Toru, to Kawasaki Jukogyo Kabushiki Kaisha. Fabrication of panel structures having thin skin plate in vehicles, water craft, buildings, and the like. 4,058,883, Cl. 29-448.000.
Yoshioka, Yoshio; Hirasawa, Kunio; and Tsukushi, Masanori, to Hitachi, Ltd. Puffer type gas circuit breaker. 4,059,741, Cl. 200-148.00A.
Yoshizaki, Hiroyuki; Takanihashi, Hiromitsu; and Masuda, Yoshitaka, to Mitsubishi Gas Chemical Company, Inc. Process for producing a branched polycarbonate or poly(ester-carbonate). 4,059,565, Cl. 260-47.0XA.
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Young Industries, Inc., The: *See*—
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Young, Richard E., to Young Fire Equipment Corporation. Fire engine construction. 4,059,170, Cl. 180-54.00R.
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Zelt, Edward J.: *See*—
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Zeutschel, Heinz: *See*—
Gernhardt, Wolfram; Meier-Maletz, Gerhard; and Zeutschel, Heinz, 4,059,475, Cl. 156-379.000.
Zharovsky, Ivan Vasilievich: *See*—
Barannik, Ivan Andreevich; Kondratenko, Anatoly Borisovich; Trukhin, Alexandr Fedorovich; Raskatov, Viktor Georgievich; Zharovsky, Ivan Vasilievich; Rudakov, Viktor Alexandrovich; Mordkovich, Andrei Efremovich; and Chalov, Alexandr Vasilievich, 4,059,372, Cl. 425-8.000.
Zieg, Steven A., to Purex Corporation. Pump basket strainer and assembly. 4,059,519, Cl. 210-169.000.
Zimmer, Elvis Simon; and Hassell, David Allen, to Paulucci, Jeno F. Food oven. 4,059,398, Cl. 432-121.000.
Zlatkin, Yakov Iosifovich: *See*—
Vasiliev, Vladimir Sergeevich; Livshits, Abram Lazarevich; Polotsky, Vadim Evgenievich; and Zlatkin, Yakov Iosifovich, 4,059,788, Cl. 318-577.000.
Zweigle, Maurice L.; and Lamphere, Jack C., to Dow Chemical Company, The. Cross-linked water-swellable polymer particles. 4,059,552, Cl. 260-29.6TA.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 22ND DAY OF NOVEMBER, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Ampex Corporation: *See*—
Monforte, Frank R.; and Argentina, Giltan M., Re. 29,476, Cl. 29-600.000.

Argentina, Giltan M.: *See*—
Monforte, Frank R.; and Argentina, Giltan M., Re. 29,476, Cl. 29-600.000.

Axen, Rolf E. A. V.; Porath, Jerker O.; and Wide, Leif Edvin, to Pharmacia AB. Method for determining vitamin B_{12} and reagent therefor. Re. 29,480, Cl. 424-1.500.

Glacier Industries, Inc.: *See*—
Wight, Edward M., Re. 29,477, Cl. 62-266.000.

Goren, Yoram; and Lloyd, Samuel H., III, to Santa Fe International Corporation. Single column semisubmersible drilling vessel. Re. 29,478, Cl. 114-265.000.

Lloyd, Samuel H., III: *See*—
Goren, Yoram; and Lloyd, Samuel H., III, Re. 29,478, Cl. 114-265.000.

Mohr, Joseph J. Tennis Ball pitching apparatus with anti-jamming ball feed mechanism. Re. 29,479, Cl. 124-1.000.

Monforte, Frank R.; and Argentina, Giltan M., to Ampex Corporation. Method for fabricating a dielectric filled ferrite toroid for use in microwave devices. Re. 29,476, Cl. 29-600.000.

Pharmacia AB: *See*—
Axen, Rolf E. A. V.; Porath, Jerker O.; and Wide, Leif Edvin, Re. 29,480, Cl. 424-1.500.

Porath, Jerker O.: *See*—
Axen, Rolf E. A. V.; Porath, Jerker O.; and Wide, Leif Edvin, Re. 29,480, Cl. 424-1.500.

Santa Fe International Corporation: *See*—
Goren, Yoram; and Lloyd, Samuel H., III, Re. 29,478, Cl. 114-265.000.

Wide, Leif Edvin: *See*—
Axen, Rolf E. A. V.; Porath, Jerker O.; and Wide, Leif Edvin, Re. 29,480, Cl. 424-1.500.

Wight, Edward M., to Glacier Industries, Inc. Food product freezing apparatus. Re. 29,477, Cl. 62-266.000.

LIST OF PLANT PATENTEES

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Jessel, Walter H., Jr.; and Duffett, William E., 4,153, Cl. 74.000.
Jessel, Walter H., Jr.; and Duffett, William E., 4,156, Cl. 74.000.

Holtkamp, Hermann, Sr. African violet plant. 4,154, 11-22-77, Cl. 69.000.

Jessel, Walter H., Jr.; and Duffett, William E., to Yoder Brothers, Inc. Chrysanthemum plant. 4,153, 11-22-77, Cl. 74.000.

Jessel, Walter H., Jr.; and Duffett, William E., to Yoder Brothers, Inc. Chrysanthemum plant. 4,156, 11-22-77, Cl. 74.000.

Schmidt, John Frank, Jr. Mountain ash tree. 4,157, 11-22-77, Cl. 51.000.

Yoder Brothers, Inc.: *See*—
Jessel, Walter H., Jr.; and Duffett, William E., 4,153, Cl. 74.000.
Jessel, Walter H., Jr.; and Duffett, William E., 4,156, Cl. 74.000.

Zaiger, Chris Floyd. Nectarine tree. 4,155, 11-22-77, Cl. 41.000.

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Ajax Hardware Corporation: *See*—
Ridgway, Keith E.; and Scott, Edward W., 246,418, Cl. D8-302.000.
Ridgway, Keith E.; and Scott, Edward W., 246,419, Cl. D8-302.000.
Ridgway, Keith E.; and Scott, Edward W., 246,421, Cl. D8-306.000.
Ridgway, Keith E.; and Scott, Edward W., 246,423, Cl. D8-310.000.
Ridgway, Keith E.; and Scott, Edward W., 246,426, Cl. D8-318.000.
Ridgway, Keith E.; and Scott, Edward W., 246,427, Cl. D8-318.000.
Ridgway, Keith E.; and Scott, Edward W., 246,434, Cl. D8-350.000.

American Cyanamid Company: *See*—
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Amerock Corporation: *See*—
Clayton, LaVerne E., 246,422, Cl. D8-307.000.
Clayton, LaVerne E., 246,424, Cl. D8-317.000.
Clayton, LaVerne E., 246,431, Cl. D8-327.000.
Pittenger, Teresa R. B., 246,420, Cl. D8-306.000.
Stone, Leland George, 246,425, Cl. D8-318.000.
Stone, Leland George, 246,435, Cl. D8-350.000.
Tegner, Raymond U. H., 246,404, Cl. D6-89.000.
Tegner, Raymond U. H., 246,406, Cl. D6-92.000.
Tegner, Raymond U. H., 246,432, Cl. D8-350.000.
Tegner, Raymond U. H., 246,433, Cl. D8-350.000.

Anchor Hocking Corporation: *See*—
Benes, Frank J., 246,446, Cl. D11-153.000.

Anderson, Michael G.: *See*—
Segal, Charles L.; Anderson, Michael G.; and Vincent, David N., 246,474, Cl. D34-5.0ST.

Arnett, Luke: *See*—
Morton, James D.; and Arnett, Luke, 246,469, Cl. D25-7.000.

Asano, Kiyoji. Toy vehicle. 246,479, 11-22-77, Cl. D34-15.0AJ.

Asano, Kiyoji. Toy vehicle. 246,480, 11-22-77, Cl. D34-15.0AJ.

Attree, James Albert; and Morallee, Kenneth George, to Lever Brothers Company. Tray for biological tests. 246,466, 11-22-77, Cl. D24-31.000.

Aupperle, Donald P., to Hewlett-Packard Company. Portable electronic multimeter. 246,442, 11-22-77, Cl. D10-78.000.

Ball Corporation: *See*—
Wildgen, Leo F., 246,413, Cl. D7-64.000.

Bashore, Terry L. Animal warning sign. 246,485, 11-22-77, Cl. D96-12.00C.

Baxter Travenol Laboratories, Inc.: *See*—
Bruni, James G.; George, Richard W.; Hauser, Stephen G.; Hodgson, Charles E.; and Range, Richard J., 246,465, Cl. D24-21.000.

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Bergendorff, Fred. Straightedge. 246,441, 11-22-77, Cl. D10-71.000.

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Harms, Wolfgang; Johnson, Marshall B.; Bergmann, Karl H.; and Gelak, Richard G., 246,410, Cl. D7-41.000.

Blanchard, Robert E. Pie cutter. 246,411, 11-22-77, Cl. D7-43.000.

Brazell, David O., to Fireplace Sales, Division of Taylor Construction. Chimney cap. 246,464, 11-22-77, Cl. D23-154.000.

Brezney, Jacqueline, to Unican Security Systems, Ltd. Pull. 246,428, 11-22-77, Cl. D8-318.000.

Brezney, Jacqueline, to Unican Security Systems, Ltd. Back plate. 246,436, 11-22-77, Cl. D8-350.000.

Brio Toy AB: *See*—
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Brown & Williamson Tobacco Corporation: *See*—
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Bruni, James G.; George, Richard W.; Hauser, Stephen G.; Hodgson, Charles E.; and Range, Richard J., to Baxter Travenol Laboratories, Inc. Proportional dialysis unit. 246,465, 11-22-77, Cl. D24-21.000.

Brunner, Donald A., to Dart Industries Inc. Cookie cutter or the like. 246,412, 11-22-77, Cl. D7-43.000.

Callecod, Robert L., to Recreation Systems Co. Child recreation structure. 246,477, 11-22-77, Cl. D34-5.00L.

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Champion International Corporation: *See—*
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Chapman, Darwin E. Darkroom exposure meter and densitometer. 246,461, 11-22-77, Cl. D16-39.000.

Chermak, William J.; Kozan, F. Joseph; and Wahi, Chander M., to E. F. Johnson Company. Variable capacitor. 246,453, 11-22-77, Cl. D13-21.000.

Christiansen, Walter N., to Gardner-Denver Company. Hand-held tool for removing insulation from electrical conductors. 246,417, 11-22-77, Cl. D8-98.000.

Clark Equipment Company: *See—*
Shealy, Noah Alvin, 246,451, Cl. D12-160.000.

Clayton, LaVerne E., to Amerock Corporation. Pendant pull. 246,422, 11-22-77, Cl. D8-307.000.

Clayton, LaVerne E., to Amerock Corporation. Pull. 246,424, 11-22-77, Cl. D8-317.000.

Clayton, LaVerne E., to Amerock Corporation. Hinge base. 246,431, 11-22-77, Cl. D8-327.000.

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Critcher, John L. Wrench socket. 246,415, 11-22-77, Cl. D8-29.000.

Dart Industries Inc.: *See—*
Brunner, Donald A., 246,412, Cl. D7-43.000.

Denman, O. Jackson. Head for a golf putter. 246,475, 11-22-77, Cl. D34-5.0GH.

DiPasqua, Joseph N. Building. 246,468, 11-22-77, Cl. D25-5.000.

Doman, Donald W., to Kohler Co. Combined sink and faucet. 246,463, 11-22-77, Cl. D23-49.000.

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E. F. Johnson Company: *See—*
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Eastman Kodak Company: *See—*
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Ebner, John S.; Steinman, Sheldon; and Haase, Frederick W., to Milgo Electronic Corporation. Printed circuit cabinet. 246,454, 11-22-77, Cl. D13-41.000.

Ernest, Robert Orman, to Sunbeam Corporation. Combined fire and smoke alarm. 246,443, 11-22-77, Cl. D10-106.000.

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Hamilton, William H. Window greenhouse. 246,447, 11-22-77, Cl. D11-145.000.

Hansa Plastics Inc.: *See—*
Schmidt, Harald, 246,416, Cl. D8-97.000.

Hanson, Wallace E., to Champion International Corporation. Display carton. 246,440, 11-22-77, Cl. D9-224.000.

Harms, Wolfgang; Johnson, Marshall B.; Bergmann, Karl H.; and Gelak, Richard G., to Melitta, Inc. Coffeemaker or the like. 246,410, 11-22-77, Cl. D7-41.000.

Harris, Moye. Bicycle fairing. 246,452, 11-22-77, Cl. D12-182.000.

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Holdam, James Vance, Jr. Table. 246,407, 11-22-77, Cl. D6-179.000.

Hopkins, Evan Leon; and Cartner, Donald W., to Hopkins Manufacturing Corporation. Ice and snow scraper. 246,414, 11-22-77, Cl. D7-181.000.

Hopkins Manufacturing Corporation: *See—*
Hopkins, Evan Leon; and Cartner, Donald W., 246,414, Cl. D7-181.000.

Ideal Toy Corporation: *See—*
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Inman, Bruce Wayne. Back pack signal light unit. 246,445, 11-22-77, Cl. D10-114.000.

James, David F., to Norris Industries, Inc. Pendant pull for doors, drawers or the like. 246,429, 11-22-77, Cl. D8-321.000.

James, David F., to Norris Industries, Inc. Hinge leaf. 246,430, 11-22-77, Cl. D8-327.000.

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Lohr, Raymond J. Toy vehicle. 246,478, 11-22-77, Cl. D34-15.0AJ.

Lynn, Elmer C.; and Slaughter, Leonard, Jr. Packaging container or the like. 246,439, 11-22-77, Cl. D9-219.000.

Matsuda, Kazuo; and Kojima, Hiroshi. Vehicle tire. 246,450, 11-22-77, Cl. D12-141.000.

McGuire, Donald. Baseball game bangboard. 246,476, 11-22-77, Cl. D34-5.0PP.

Melitta, Inc.: *See—*
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Mitsui, Hiroyasu. Remote operated drain for an oil pan. 246,456, 11-22-77, Cl. D15-5.000.

Morallee, Kenneth George: *See—*
Attree, James Albert; and Morallee, Kenneth George, 246,466, Cl. D24-31.000.

Morgan, Peter William Swift, to Dunlop Limited. Skirt. 246,402, 11-22-77, Cl. D2-224.000.

Morton, James D.; and Arnett, Luke. Building. 246,469, 11-22-77, Cl. D25-7.000.

Muller-Scherak, Wolf Georg. Jacket or similar article. 246,401, 11-22-77, Cl. D2-191.000.

Nakao, Shinroku, to Combi Co., Ltd. Toy vehicle. 246,481, 11-22-77, Cl. D34-15.0AJ.

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Rex, Albert Edward, to General & Railway Supplies Pty. Ltd. Railroad tie. 246,448, 11-22-77, Cl. D12-49.000.

Richards, Theodore W. Combined soap holder and paper towel dispenser. 246,405, 11-22-77, Cl. D6-91.000.

Ridgway, Keith E.; and Scott, Edward W., to Ajax Hardware Corporation. Door pull having simulated thumb lever. 246,418, 11-22-77, Cl. D8-302.000.

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Tegner, Raymond U. H., to Amerock Corporation. Keyhole escutcheon. 246,433, 11-22-77, Cl. D8-350.000.
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Yoshino, Zenzaburo. Single lens reflex camera. 246,460, 11-22-77, Cl. D16-08.000.

CLASSIFICATION OF PATENTS

ISSUED NOVEMBER 22, 1977

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4 4,058,868
101 4,058,869
104.1 R 4,058,870

CLASS 16

172 4,058,871

CLASS 17

1 R 4,058,872

CLASS 23

230 B 4,059,404
230 R 4,059,405
4,059,406
253 TP 4,059,407
267 R 4,059,408
284 4,059,409

CLASS 24

73 CH 4,058,873

CLASS 28

153 4,058,874

CLASS 29

25.15 4,058,875
78 4,058,876
116 AD 4,058,877
4,058,878
132 4,058,879
156.8 P 4,058,880
407 4,058,882
448 4,058,883
526 R 4,058,884
559 4,058,885
563 4,058,886
571 4,058,887
593 4,058,888
600 Re.29,476
623.5 4,058,889
625 4,058,890
715 4,058,881

CLASS 30

30 4,058,891
178 4,058,892
250 4,058,893
251 4,058,894

CLASS 32

32 4,058,895
33 4,058,896
40 R 4,058,897
59 4,058,898

CLASS 33

26 4,058,899
148 E 4,058,900
178 R 4,058,901
189 4,058,902
288 4,058,903

CLASS 34

12 4,058,904
15 4,058,905
16.5 4,058,906
61 4,058,907
149 4,058,908

CLASS 35

16 4,058,909
17 4,058,910
22 R 4,058,911
34 4,058,912

CLASS 37

50 4,058,913
66 4,058,914
117.5 4,058,915

CLASS 40

107 4,058,916
125 M 4,058,917
129 C 4,058,918
130 E 4,058,919
336 4,058,920

CLASS 42

1 G 4,058,921
16 4,058,922
17 4,058,923
69 R 4,058,924
79 4,058,925

CLASS 43

43.12 4,058,926
43.13 4,058,927
131 4,058,928

CLASS 44

1 R 4,059,410
10 H 4,059,412
51 4,059,411
58 4,059,414

CLASS 47

41.12 4,058,929
58 4,058,930
87 4,058,931

CLASS 48

63 4,059,415
197 R 4,059,416

CLASS 49

56 4,059,413
177 4,058,932

CLASS 51

5 D 4,058,933
4,058,934
163.1 4,058,935
170 T 4,058,936
259 4,058,937
287 4,058,938
309 A 4,059,417

CLASS 52

2 4,058,939
104 4,058,940
169.1 4,058,941
179 4,058,942
227 4,058,943
235 4,058,944
244 4,058,945
273 4,058,946
396 4,058,947
405 4,058,948
407 4,058,949
461 4,058,950
656 4,058,951
741 4,058,952

CLASS 53

22 A 4,058,953
54 4,058,954
212 4,058,955

CLASS 55

73 4,059,418
92 4,059,419
112 4,059,420
196 4,059,421
418 4,059,422

CLASS 56

1 4,058,956
11.3 4,058,957
228 4,058,958
295 4,058,959

CLASS 57

34 AT 4,058,960
34 HS 4,058,961
34 R 4,058,962
56 4,058,963
58.89 4,058,964
58.91 4,058,965
78 4,058,966
140 J 4,058,967
140 R 4,058,968

CLASS 58

23 BA 4,058,969
23 R 4,058,970
39.5 4,058,971
88 E 4,058,972

CLASS 60

39.09 R 4,058,973
39.12 4,058,974
39.28 T 4,058,975
39.46 S 4,058,976
39.65 4,058,977
277 4,058,978
327 4,058,979
337 4,058,980
605 4,058,981

CLASS 61

1 R 4,058,982
41 A 4,058,983
48 4,058,984
54 4,058,985
63 4,058,986
86 4,058,987

CLASS 62

49 4,059,424
160 4,058,988
256 4,058,989
266 Re.29,477

CLASS 64

1 S 4,058,990

CLASS 65

21 4,059,423
22 4,059,425
25 A 4,059,426
4,059,427
33 4,059,428
355 4,059,429

CLASS 68

205 R 4,058,991

CLASS 70

34 4,058,992
58 4,058,993
232 4,058,994
431 4,058,995

CLASS 71

86 4,059,430
87 4,059,431
4,059,432
90 4,059,433
92 4,059,434
105 4,059,435
118 4,059,436

CLASS 72

49 4,058,996
50 4,058,997
84 4,058,998
102 4,058,999
197 4,059,000
214 4,059,001
238 4,059,002
256 4,059,003
299 4,059,004

CLASS 73

1 B 4,059,005
17 A 4,059,006
38 4,059,008
61.1 C 4,059,009
133 R 4,059,011
141 A 4,059,012
159 4,059,013
190 R 4,059,007
194 EM 4,059,014
209 4,059,015
304 R 4,059,016
395 4,059,017
418 4,059,018
421.5 A 4,059,019
425.4 P 4,059,020
596 4,059,010

CLASS 74

89.2 4,059,021
226 4,059,022
230.3 4,059,023
421 R 4,059,024
482 4,059,025
711 4,059,026
718 4,059,027
781 B 4,059,028
785 4,059,029
798 4,059,030

CLASS 75

76 4,059,437
81 4,059,438
122.7 4,059,439
126 C 4,059,440
174 4,059,441
208 R 4,059,442

CLASS 76

108 R 4,059,031

CLASS 81

3 R 4,059,032
3.1 B 4,059,033
57.37 4,059,034

CLASS 83

1 4,059,035
188 4,059,036
407 4,059,037
745 4,059,038

CLASS 84

1.01 4,059,039
1.03 4,059,040

CLASS 85

3 S 4,059,041

CLASS 91

469 4,059,042

CLASS 93

1 C 4,059,043
93 HT 4,059,044

CLASS 96

1 LY 4,059,444
1 PS 4,059,443
35 4,059,445
50 R 4,059,446
56.4 4,059,447
84 A 4,059,448
91 D 4,059,449
101 4,059,450

CLASS 98

122 4,059,045

CLASS 99

355 4,059,046
455 4,059,047
482 4,059,048

CLASS 100

41 4,059,049
91 4,059,050

CLASS 101

45 4,059,051

CLASS 102

70.2 P 4,059,052

CLASS 104

35 4,059,053
88 4,059,054

CLASS 105

368 R 4,059,055
4,059,056

CLASS 106

1.26 4,059,451
14 4,059,452
38.3 4,059,453
39.7 4,059,454
58 4,059,455
114 4,059,456
203 4,059,457
213 4,059,458
298 4,059,459

CLASS 108

51.1 4,059,057
129 4,059,058

CLASS 109

1 R 4,059,059

CLASS 110

1 J 4,059,060
7 A 4,059,061

CLASS 112

258 4,059,062

CLASS 114

106 4,059,063
144 E 4,059,064
256 4,059,065
265 Re.29,478

CLASS 116

115 4,059,066

CLASS 118

7 4,059,067
420 4,059,068
642 4,059,069

CLASS 119

14.47 4,059,070
18 4,059,071
51.13 4,059,072
98 4,059,073
156 4,059,074

CLASS 122

6 A 4,059,075

CLASS 123

3 4,059,076
23 4,059,077
25 K 4,059,078
30 D 4,059,079
41.33 4,059,080
103 R 4,059,088
136 4,059,081
141 4,059,082
146.5 A 4,059,083
148 E 4,059,084
195 R 4,059,085
196 R 4,059,086
196 S 4,059,087

CLASS 124

1 Re.29,479
27 4,059,089

CLASS 126

121 4,059,090
140 4,059,091
215 4,059,092
271 4,059,093
4,059,094
4,059,095
375 4,059,096

CLASS 127

29 4,059,460

CLASS 128

1 R 4,059,097
2 V 4,059,098
2.05 V 4,059,169
28 4,059,099
36 4,059,100
62 A 4,059,101
92 B 4,059,102
96 4,059,103
132 D 4,059,104
133 4,059,105
4,059,106
173 H 4,059,107
214 R 4,059,108
218 A 4,059,110
218 M 4,059,109
223 4,059,111
272.3 4,059,112
276 4,059,113
287 4,059,114
317 4,059,115
419 PO 4,059,116
531 4,059,117

CLASS 131

8 R 4,059,118
9 4,059,119
23 R 4,059,120
269 4,059,121

CLASS 133

3 D 4,059,122

CLASS 134

102 4,059,123

CLASS 137

38 4,059,124
73 4,059,125
82 4,059,130
142 4,059,126
244 4,059,127
487.5 4,059,128

CLASS 138

37 4,059,129

CLASS 139

59 4,059,131
207 4,059,132
440 4,059,133

CLASS 141

59 4,059,134
207 4,059,135

CLASS 148

1.5 4,059,461
31.55 4,059,462
105 4,059,463

CLASS 151

14.5 4,059,136

CLASS 152

232 4,059,137
330 RF 4,059,138

CLASS 156

66 4,059,464
72 4,059,465
78 4,059,466
80 4,059,467
93 4,059,468
108 4,059,469
238 4,059,470
244 4,059,471
259 4,059,472
308 4,059,473
356 4,059,474
379 4,059,475
384 4,059,476
479 4,059,477
510 4,059,478
640 4,059,479
644 4,059,480
660 4,059,481

CLASS 157

1.17 4,059,140
13 4,059,139

CLASS 160

90 4,059,141

CLASS 162

281 4,059,482

CLASS 164

49 4,059,142
113 4,059,143
166 4,059,144

CLASS 165

1 4,059,145
45 4,059,146
133 4,059,147

CLASS 166

.5 4,059,148
64 4,059,149
120 4,059,150
258 4,059,151
261 4,059,152
264 4,059,153
274 4,059,154
301 4,059,155
314 4,059,156
317 4,059,157

CLASS 171

63 4,059,158

CLASS 172

7 4,059,159
47 4,059,160
60 4,059,161

CLASS 173

37 4,059,162

CLASS 174

19 4,059,722
21 R 4,059,723
36 4,059,724

CLASS 175

73 4,059,163
4,059,164
107 4,059,165
232 4,059,166
297 4,059,167

CLASS 176

78 4,059,483
4,059,484

CLASS 179

1.5 D 4,059,725
1.5 M 4,059,726
2 AM 4,059,727
2 E 4,059,728
15 AS 4,059,730
15 BF 4,059,729
15 BY 4,059,731
18 B 4,059,732
18 BC 4,059,735
18 BD 4,059,734
18 ET 4,059,733
175.2 R 4,059,736

CLASS 180

1 P 4,059,168
54 R 4,059,170
77 S 4,059,171

CLASS 187

9 E 4,059,172

CLASS 188

110 4,059,173
195 4,059,174
285 4,059,175

CLASS 192

12 BA 4,059,176
41 S 4,059,177
53 F 4,059,178
98 4,059,179

CLASS 193

37 4,059,180

CLASS 194

13 4,059,181

CLASS 195

1.8 4,059,485
4,059,486
28 N 4,059,487
28 R 4,059,488
31 F 4,059,489
99 4,059,490
103.5 A 4,059,491

CLASS 197

1 R 4,059,182
4,059,183
18 4,059,184

CLASS 198

339 4,059,185
461 4,059,187
477 4,059,188
481 4,059,186

CLASS 200

5 A 4,059,737
6 B 4,059,738
51.09 4,059,739
52 R 4,059,740
148 A 4,059,741

CLASS 203

11 4,059,492

CLASS 204

3 4,059,493
28 4,059,494
98 4,059,495
104 4,059,496
165 4,059,497
188 4,059,498
195 M 4,059,499
288 4,059,500
299 R 4,059,501

CLASS 208

152 4,059,502
254 H 4,059,503
255 4,059,504
310 Z 4,059,505

CLASS 209

18 4,059,506
112 4,059,189
139 A 4,059,507
151 4,059,508
166 4,059,509
223 A 4,059,510

CLASS 210

23 R 4,059,511
24 4,059,512
45 4,059,513
49 4,059,514
51 4,059,515
53 4,059,516
73 R 4,059,517
108 4,059,518
169 4,059,519
184 4,059,520
195 S 4,059,521
198 C 4,059,523
198 R 4,059,522
220 4,059,524
236 4,059,525
242 S 4,059,526
259 4,059,527
282 4,059,528
321 B 4,059,530
519 4,059,529
522 4,059,531

CLASS 211

57.1 4,059,190
90 4,059,191

CLASS 213

61 4,059,192

CLASS 214

8.5 A 4,059,193
38 CA 4,059,194
44 R 4,059,195
138 R 4,059,196
451 4,059,197

CLASS 215

222 4,059,198

CLASS 219

10.55 D 4,059,742
121 P 4,059,743

CLASS 220

3.8 4,059,199
233 4,059,200
258 4,059,201
325 4,059,202

CLASS 221

73 4,059,203

CLASS 222

146 HE 4,059,204
368 4,059,205
413 4,059,206

CLASS 224

31 4,059,207
45 S 4,059,208
4,059,209

CLASS 225

47 4,059,210

CLASS 226

11 4,059,211
141 4,059,212
151 4,059,213

CLASS 228

173 C 4,059,215
179 4,059,216
181 4,059,217
207 4,059,218
265 4,059,214

CLASS 229

2.5 EC 4,059,219
37 R 4,059,220
39 R 4,059,221
54 R 4,059,222

CLASS 233

1 R 4,059,223

CLASS 235

92 FL 4,059,744
302 4,059,749
303.1 4,059,748
437 4,059,225
462 4,059,224

CLASS 237

1 A 4,059,226

CLASS 239

1 4,059,227
106 4,059,228
183 4,059,229
542 4,059,230

CLASS 241

5 4,059,231
46.17 4,059,232
47 4,059,233
222 4,059,234
223 4,059,235
243 4,059,236
246 4,059,237

CLASS 242

7.21 4,059,238
18.1 4,059,239
47.01 4,059,240
75.5 4,059,241
107.4 A 4,059,242
129.6 4,059,243
200 4,059,244
201 4,059,245

CLASS 243

7 4,059,246

CLASS 244

7 R 4,059,247

CLASS 248

214 4,059,248

CLASS 249

58 4,059,249

CLASS 250

201 4,059,756
4,059,757
4,059,758
206 4,059,759
253 4,059,760
287 4,059,761
336 4,059,762
4,059,763
352 4,059,764
367 4,059,765
370 4,059,766
461 R 4,059,767
483 4,059,768
493 4,059,769

CLASS 251

304 4,059,250

CLASS 252

8.1 4,059,532
8.5 A 4,059,533
32.7 E 4,059,534
33 4,059,535
33.3 4,059,536
62.9 4,059,537
95 4,059,538
301.1 R 4,059,539
309 4,059,540
313 R 4,059,541
431 P 4,059,542
455 Z 4,059,543
471 4,059,544

CLASS 260

2.5 FP 4,059,545
16 4,059,546
17 R 4,059,547
22 TN 4,059,549
29.4 R 4,059,550
29.6 H 4,059,551
29.6 S 4,059,553
29.6 TA 4,059,552
29.6 WQ 4,059,554
29.7 H 4,059,555
30.2 4,059,556
31.2 N 4,059,557
42.33 4,059,558
45.7 R 4,059,560
45.75 S 4,059,562
45.8 R 4,059,561
45.95 H 4,059,563
47 ET 4,059,568
47 R 4,059,567
47 XA 4,059,565
4,059,566
48 4,059,569
77.5 AP 4,059,570
112 B 4,059,571
112 R 4,059,572
112.5 R 4,059,573
192 4,059,574
239.5 4,059,575
251 R 4,059,548
252 4,059,582
256.5 R 4,059,583
268 BC 4,059,584
286 Q 4,059,585
287 D 4,059,586
301 4,059,587
306.7 C 4,059,589
306.7 T 4,059,588
306.8 R 4,059,590
308 D 4,059,591
4,059,592
340.5 R 4,059,593
340.7 4,059,594
345.9 R 4,059,595
347.7 4,059,597
347.8 4,059,596
348.16 4,059,598
348.29 4,059,599
348.46 4,059,600
408 4,059,601
4,059,602
4,059,603
412.4 4,059,604
448.2 B 4,059,605
4,059,606
448.2 E 4,059,559
4,059,607
4,059,608
455 A 4,059,609
456 P 4,059,611
456 R 4,059,612
502 R 4,059,619
513 T 4,059,620
558 R 4,059,621
559 A 4,059,622
561 A 4,059,623
565 4,059,624
566 AE 4,059,625
578 4,059,626
580 4,059,627
581 4,059,628
583 GG 4,059,629
584 B 4,059,631
586 C 4,059,632
586 E 4,059,630
593 H 4,059,633
593 R 4,059,634
609 D 4,059,636
609 E 4,059,635
610 A 4,059,637
613 R 4,059,638
614 F 4,059,639
635 R 4,059,640
4,059,641
650 R 4,059,642
666 PY 4,059,643
4,059,644
668 A 4,059,645
676 R 4,059,646
4,059,647
4,059,648
683.48 4,059,649
837 R 4,059,650
848 4,059,651
4,059,652
857 PG 4,059,653
897 A 4,059,654
983 4,059,655
990 4,059,656

CLASS 261

104 4,059,657

CLASS 264

43 4,059,658
45.3 4,059,659
46.4 4,059,564
4,059,660
54 4,059,661
62 4,059,662
65 4,059,663
66 4,059,664
128 4,059,665
129 4,059,666
289 4,059,667
290 R 4,059,668
319 4,059,669

CLASS 266

235 4,059,251
236 4,059,252
259 4,059,253

CLASS 267

140 4,059,254

CLASS 269

323 4,059,255

CLASS 270

52 4,059,256
66 4,059,257
67 4,059,258

CLASS 271

3 4,059,259
4,059,260
9 4,059,261
35 4,059,262
171 4,059,263
270 4,059,264

CLASS 272

137 4,059,265

CLASS 273

1 E 4,059,266
54 B 4,059,267
55 R 4,059,268
67 A 4,059,269
77 R 4,059,270
95 A 4,059,271
130 D 4,059,274
4,059,275
130 E 4,059,272
130 R 4,059,273
134 D 4,059,276

CLASS 274

23 A 4,059,277

CLASS 277

139 4,059,278
166 4,059,279
188 A 4,059,280

CLASS 280

5 A 4,059,281
47.13 B 4,059,282
461 A 4,059,283
605 4,059,284
651 4,059,285
673 4,059,286
745 4,059,287

CLASS 285

2 4,059,288
56 4,059,289
169 4,059,290
197 4,059,291
229 4,059,292
236 4,059,293
238 4,059,294
305 4,059,295
312 4,059,296
340 4,059,297

CLASS 290

4 C 4,059,770
44 4,059,771

CLASS 292

199 4,059,298
294 4,059,299
322 4,059,300

CLASS 293

62 4,059,301

CLASS 294

74 4,059,302

CLASS 296

28 M 4,059,303
35 R 4,059,304

CLASS 297

338 4,059,305
452 4,059,306

CLASS 298

23 R 4,059,307

CLASS 299

5 4,059,308
18 4,059,309

CLASS 302

42 4,059,310
53 4,059,311

CLASS 303

92 4,059,312

CLASS 305

19 4,059,313
31 4,059,314
35 EB 4,059,315

CLASS 307

46 4,059,772
115 4,059,773
299 R 4,059,774

CLASS 308

8.2 4,059,316
72 4,059,317
73 4,059,318

CLASS 310

12 4,059,775
64 4,059,777
68 D 4,059,778
77 4,059,779
164 4,059,780
242 4,059,776

CLASS 312

319 4,059,319

CLASS 313

403 4,059,781

CLASS 315

58 4,059,782
107 4,059,783
349 4,059,784
378 4,059,785

CLASS 318

17 4,059,786
568 4,059,787
577 4,059,788
608 4,059,789
689 4,059,790

CLASS 323

19 4,059,793

CLASS 324

60 C 4,059,797
127 4,059,798
169 4,059,799
208 4,059,794
233 4,059,795
253 4,059,796

CLASS 325

38 B 4,059,800
167 4,059,801
398 4,059,802
445 4,059,803

CLASS 328

134 4,059,804

CLASS 329

50 4,059,805
107 4,059,806

CLASS 330

10 4,059,807
65 4,059,810
253 4,059,809
257 4,059,808
277 4,059,811

CLASS 331

1 A 4,059,812
94 4,059,813

CLASS 333

29 4,059,814
82 BT 4,059,815

CLASS 337

278 4,059,816
365 4,059,817

CLASS 339

19 4,059,320
34 4,059,321
44 R 4,059,322
60 R 4,059,329
75 M 4,059,323
89 M 4,059,324
94 A 4,059,325
113 R 4,059,326
4,059,332
122 R 4,059,327
4,059,328
177 R 4,059,330
198 R 4,059,331
247 4,059,333
258 F 4,059,334
272 UC 4,059,335

CLASS 340

8 LF 4,059,819
15.5 DP 4,059,818
15.5 SW 4,059,820
44 4,059,821
52 H 4,059,822
58 4,059,823
71 4,059,824
146.1 D 4,059,825
274 R 4,059,832
279 4,059,830

CLASS 343

6.8 R 4,059,831

CLASS 346

108 4,059,833

CLASS 350

55 4,059,336
96 C 4,059,337
4,059,338
117 4,059,339
160 LC 4,059,340
160 R 4,059,341
175 ML 4,059,342
182 4,059,343
220 4,059,344
252 4,059,345
295 4,059,346
319 4,059,347

CLASS 351

30 4,059,348

CLASS 352

72 4,059,349
141 4,059,350

CLASS 353

43 4,059,351
103 4,059,352

CLASS 354

1 4,059,834
24 4,059,835
29 4,059,836

CLASS 355

16 4,059,353
22 4,059,354
43 4,059,355

CLASS 356

204 4,059,356
222 4,059,359
243 4,059,357

CLASS 357

73 4,059,837

CLASS 358

27 4,059,838
44 4,059,839
48 4,059,840
128 4,059,841
150 4,059,842

CLASS 361

93 4,059,843
152 4,059,844
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